

**CONSIDERATIONS FOR IMPROVING COMPLEMENTARY
FEEDING PRACTICES AMONG INFANTS OF 6-11
MONTHS IN NORTHERN UGANDA**

ACHENG AGNES

BSc. FPT (KYU)

2008/HDO2/11696U

**RESEARCH REPORT SUBMITTED TO THE SCHOOL OF GRADUATE STUDIES
IN PARTIAL FULFILMENT FOR THE AWARD OF A MASTERS OF SCIENCE IN
APPLIED HUMAN NUTRITION OF MAKERERE UNIVERSITY**

MAY 2014

Declaration

I, Acheng Agnes, certify that the work presented in this thesis is from my own research and has not been submitted for a degree in any other university

Signed:.....

Agnes Acheng, BSc. FPT, KYU

Researcher

Date:.....

This thesis has been submitted for examination with our approval as University Supervisors.

Signed:.....

Yusuf B. Byaruhanga, PhD

Supervisor

Date:.....

Signed:.....

Robert Mwadime, PhD

Supervisor

Date:.....

Acknowledgment

Utmost thanks to the almighty God for my life and the good works he has done in it. I am very grateful to the Senior Regional Nutrition Advisor and the entire staff of AED/ Food and Nutrition Technical Assistance II (FANTA-2) project for granting me this research opportunity. The same goes to International Medical Corps (IMC), Kitgum field staff who hosted me while collecting data in the field.

With heartfelt joy, I thank my supervisors Dr. Robert Mwadime and Dr. Yusuf Byaruhanga for their immense support during this study. Thank you for bringing me to light when I did not understand much of these concepts. I particularly thank you for keeping your doors open when I had a million questions and seemed to be green. Your objective criticisms, advice and patience helped me so much during this study. In the same spirit I thank Brenda Namugumya for her attention and professional advice in the entire study process and for going extra miles whenever contacted

I thank Alex Mokori, Ursula Acheng and Grace Lamwaka who worked with me in one way or the other during data collection. I especially thank Alex for part of my data processing and all the friendly and professional advices offered and also for creating time whenever called upon. I thank the nine members of MSc. Applied Human Nutrition Class of 2008-2010; it was rather a team with everyone offering their expertise and advice to each other. Immaculate Kanyana, thanks for being a nice classmate and friend. I will always be indebted to my dear friend and sister, Jacqueline Abalo for all she has done for me, her friendship is always overflowing and I really appreciate it, thank you, Jackie.

Special thanks to my parents, my brothers and sisters for their love and support all the way. You people are so great! I could never wish for a better family. And to all my friends, thank you for keeping a smile on my face whenever things went wrong. I particularly thank Dr. Otim Michael for his advice and gentle push when I thought I could not take this course, I could have missed this golden opportunity.

Table of contents

Declaration.....	i
Acknowledgment.....	ii
Table of contents.....	iv
List of tables.....	viii
List of figures.....	ix
List of acronyms.....	xi
Abstract.....	xiii
CHAPTER ONE: INTRODUCTION.....	1
1.1 Background.....	1
1.2 Problem statement.....	3
1.3 Overall objective of the study.....	5
1.4 Study objectives.....	5
1.5 The research questions.....	5
CHAPTER TWO: LITERATURE REVIEW.....	6
2.1 Malnutrition and complementary feeding.....	6
2.2 Appropriate complementary feeding.....	6
2.2.1 Definitions and guidelines.....	6
2.2.2 Timing the introduction of complementary foods.....	9
2.2.3 Nutritional and energy density of foods fed to infants.....	11
2.2.4 Amount of foods fed to the Infants and the frequency of feeding.....	14
2.2.5 Food hygiene and safety.....	15

2.3	Factors likely to affect complementary feeding patterns	16
2.3.1	Knowledge about complementary feeding	17
2.3.2	Seasonality/Livelihood opportunities and appropriate processing and preservation technologies	19
2.3.3	Perceived inadequate breast milk or amount of food needed by the child	20
2.3.4	Peer and relatives pressure/cultural/traditional beliefs.....	21
2.3.5	Access to nutrient/energy dense foods	23
2.3.6	Lack of maternal time/high maternal workload	24
2.3.7	Maternal and or child's' health	25
2.4	Ways of improving complementary feeding in resource poor settings.....	25
 CHAPTER THREE: METHODOLOGY		29
3.1	Study area.....	29
3.3	Sampling methods and procedures	32
3.4	Data collection techniques and tools	33
3.4.1	Procedure for the Gibson multi-pass 24 hr dietary recall	35
3.4.2	Procedure for trials of improved practices (TIPs).....	36
3.4.3	Validation of study tools	37
3.5	Quality assurance of data	37
3.6	Analysis of the qualitative Information.....	38
3.7	Analysis of quantitative data	38
3.8	Ethical approval and considerations	39

CHAPTER FOUR: RESULTS AND DISCUSSIONS	40
4.1 Respondents' profile	40
4.2 Feeding practices of infants aged 0-11 months in the study area	40
4.2.1 Signals/indicators mothers use to introduce solids/semisolid food to the infants.	44
4.2.2 Feeding of the infants during and after illnesses.....	45
4.3 Type of foods and nutrient density of foods fed to Infants aged 6-11 months	46
4.3.1 Feeding frequency of infants 0-12 months	49
4.3.2 Dietary contributions from complementary foods.....	50
4.4 Energy and nutrients intake by infants aged 6-11 months.....	53
4.4.1 Relationship within the variables which affect IYCF practices.....	55
4.5 Challenges in complementary feeding	57
4. 5.1 Maternal time and work load.....	57
4.5.2 Food availability and seasonality	60
4.6 Other constraints faced during complementary feeding	63
4.7 Coping strategies used by households in improving complementary feeding of 6- 11 month olds	63
4.8 Opportunities of improving complementary feeding in the study area.....	64
4.9 Adoption of recommended IYCF practices	66
CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS	71
5.1 Conclusion.....	71
5.2 Recommendations.....	71
REFERENCES	73

ANNEXES	86
Annex 1: Focus group Guide for complementary feeding practices of children 6-11 months in Kitgum and Pader Districts.....	86
Annex 2: Focus group guide for modification of complementary foods commonly utilized for children 6-11 months in Kitgum and Pader Districts	88
Annex 3: Semi-structured interviews for fathers of children 0-23 months, grandmothers, and mothers above 18 Years	89
Annex 4: Fanta-2 Trials of improved practices (Tips) tool.....	96
Annex 5: Counseling guidelines and recommendations for tips	103

List of tables

Table 3.1: Data collection tools	34
Table 4.1: Feeding practices for infants 0-11 months in the study area.....	41
Table 4.2: Types of complementary foods/recipes fed to infants 6-11 months in the area	47
Table 4.3: Daily food intake and dietary contribution of complementary foods fed to infants 6-11 months old.....	51
Table 4.4: Daily total nutrients intake of infants 6-11 months old fed on complementary	53
Table 4.5: Correlation matrix showing the relations among the variables in the study	56
Table 4.6: Diseases, labour demand and crop calendar for Kitgum and Pader districts	61
Table 4.7: TIPs table showing the Trial messages, observations and challenges with the practices tried out	68

List of figures

Figure 2.1: The recommended contribution of breast milk and complementary foods compared to the total energy needs of children younger than 2 years by WHO, 1998.....	10
Figure 2.2: A conceptual framework of plausible causes to sub-optimal complementary feeding in Uganda adopted from different Literature.....	17
Figure 3.1: Map of Uganda showing locations of Kitgum and Pader Districts (as they were in 2008) and the study areas.....	30
Figure 3.2: Illustration of sampling methods and procedures.....	33
Figure 4.1: Profiles of the respondents (infants 6-11 months)	40
Figure 4.2: Frequency of feeding complementary foods in a day.....	49
Figure 4.3: Activity schedules for 5 women with infants aged 6-11 months from 6am to 8pm (15 hrs) in Palwo parish, Omia Anyima, Kitgum District.....	58
Figure 4.4: Reasons for participating in TIPs and attitudes towards recommended IYCF practices.....	66

List of acronyms

AED	Academy for Education Development
ARI	Acute Respiratory Infection
BCC	Behavior change communication
BF	Breastfeeding
C F	Complementary feeding
DHA	Docosahexaenoic acid
ESPGHAN	European Society for Pediatric Gastroenterology, Hepatology, and Nutrition
FADUA	Frequency, Amount, Density, Utilization and Active Feeding
FANTA-2	Food and Nutrition Technical Assistance -2 project
FFQ	Food frequency questionnaire
FGDs	Focus Group Discussions
GBV	Gender Based Violence
FPT	Food Processing Technology
FR	Formative Research
HAZ	Height for age Z-score
HH	Household
IDP	Internally Displaced Peoples' camp
IMC	International Medical Corps
INFACT	Infant Feeding Action Coalition
IYCF	Infant and Young child feeding
KII	Key Informants Interview
LCPUFA	Long-chain Polyunsaturated Fatty Acid

LRA	Lords' Resistance Army
MC	Mercy Corps
MoH	Ministry of Health
NGO	Non Governmental Organization
PAHO	Pan American Health Organization
PEM	Protein Energy Malnutrition
PI	Principal Investigator
RDA	Recommended dietary Allowance
SES	Socio-Economic Status
SPSS	Statistical Package for Social Scientists
SSIs	Semi structured interviews
TBA	Traditional birth attendant
TIPs	Trials for Improved Practices
TRS	Transitional Resettlement Site
UBOS	Uganda Bureau of Statistics
UDHS	Uganda Demographic Health Survey
UFCS	Uganda Food Consumption Survey
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
VHT	Village Health Team
WHO	World Health Organization
WIC	Special Supplemental Nutrition Program for Women, Infants, and Children

Abstract

Kitgum and Pader districts in Northern Uganda have had series of child nutrition programs, however; malnutrition in infants 6-11months still remains a major challenge. This study therefore sought to assess the current practices, challenges and opportunities of improving complementary feeding.

The study was cross sectional and descriptive employing both qualitative and quantitative methods. Community leaders, mothers of infants 0-11 months old, fathers and Village Health Teams (VHT) were purposively selected for the Focus Group Discussions (FGDs) and in-depth interviews. The FGD captured information on Infant and young child feeding aspects like; age at introduction of other foods than breast milk, feeds recipes and modifications, diet diversity, decision making and general perception of infant feeding within the communities. Mothers and caretakers of 100 infants (6-11months) were randomly selected for the Gibson multi-pass 24 hr recall dietary assessment. A sub-sample of 15 of the participants was selected based on observations to participate in Trials for Improved Practices (TIP) which included; increased infant eating frequency, increased nutrient density and hygiene practices. Qualitative and data were analyzed using Atlas-Ti version 6.1.1 and quantitative data was analyzed using Statistical Package for Social Scientists version 12 (SPSS). Pearson's bivariate correlation was done to establish how the different variables namely; age groups of the infants, feeding frequency, dietary diversity and nutrients intake relate to one another.

The results showed that the average age of the infants was 8.7 months. Fifty percent of the mothers initiated breastfeeding within two hours of delivery; however, more than half of the babies received pre-lacteals within 1-2 days of birth. Other foods/fluids than breast milk were introduced between 3-5 months. The mean frequency of feeding infants in 24 hours was 3.9

for age groups 6-8 months and 4.2 for infants aged 9-11 months. Seventy nine percent of the infants 9-11 months met their calorie and protein needs with mean intake of 620kcal/day and 18g/day, respectively. However, only 20% of the infants met their micronutrient needs. For vitamin A and iron intake, 60% and 40%, respectively of infants 9-11 months old met the recommended intake. Fifty four percent of the mothers are not in position to practice the recommended Infant and Young Child Feeding (IYCF) practices.

Older infants had higher energy intake than younger infants ($p=0.01$ at 99%). The high energy intake is probably due to increased feeding frequency on high energy dense foods by the older infants. The intakes of protein, zinc and iron in relation to the infants' ages were at ($p=0.031$, 0.05 and 0.031, respectively).

The results of this work suggest that micronutrients intake is still a problem for infants 6-11 months old in the area. There is need to integrate time saving and work load reduction interventions in IYCF programs.

CHAPTER ONE

INTRODUCTION

1.1 Background

The World Health Organization (WHO, 1968) defines malnutrition as "the cellular imbalance between supply of nutrients and energy and the body's demand for them to ensure growth, maintenance, and specific functions". Delayed initiation of breast-feeding, deprivation of colostrums, introduction of pre-lacteals and improper complementary feeding are significant risk factors for malnutrition among infants and young children (Kumar, Goel, Mittal and Misra, 2006). WHO (2011) recommends that babies be initiated to breastfeeding within the first hour after birth and the child be fed on only breast milk up to when they are 6 months old.

Northern Ugandan districts of Kitgum and Pader indicate high levels of malnutrition among the age group 6-11 months. Stunting level was at 27%, underweight 31% and wasting 11% compared to national averages of 21%, 12% and 23% for stunting, underweight and wasting, respectively for the same age group (IMC, 2008; UBOS, 2006). By 2011, malnutrition status of children 6-59 months in Northern Uganda measured by stunting was at, 24.7%, wasting, 3.4% and underweight, 12.3% (UBOS, 2011). There has been series of child nutritional programmes in the area following the settlement of the communities in IDP camps but malnutrition still remains a problem.

Studies have shown that infants aged below 6 months can draw all their energy, protein and micronutrient needs from breast milk alone if they are breast fed on demand (Milman,

Frongillo, Mercedes de Onis and Ji-Yun Hwang, 1994; Fewtrell, Morgan, Duggan, Guunlaugsson, Hibberd, Lucas and Kleinman, 2007; Scott, Binns, Graham and Oddy, 2009). Milman *et al.*, (1994), Fewtrell *et al.*, (2007) and Scott *et al.*, (2009) also showed that introduction of other fluids/foods before 6 months is likely to be a source of infections and may affect infants' gut integrity. After 6 months, dietary intake in addition to breast milk, child care and environmental health has the largest impact on growth and development of the child (Günther, Buyken and Koreke, 2007).

There is also rapid exhaustion of neonatal stores and the physiologic decline in breast milk concentrations of essential micronutrients—most marked for zinc and iron ((Dórea, 2002; Krebs and Hambidge, 2007). The energy gap between breast milk and nutritional requirements for infants 6-8 months is estimated at 45% and for infants 9-11months is 65% WHO, (1985b). These indicate need for nutritious complementary foods to fill the gaps.

Complementary feeding implies the provision of other foods in addition to breast milk. It can be a special preparation for the infant or usual family foods that are modified to make them easy to eat (INFACT, 2005; Monte and Giugliani, 2004; Palmer, 2009). Introduction of complementary foods to infants is often accompanied by stress and ill health (Kikafunda, Walker and Tumwine, 2003). This is when the food is not tailored to the child's needs and the feeding practices deprive the child of the highly required nutrients (UBOS, 2006). It is therefore, paramount that feeding and child care during this period be optimized, focusing mainly on frequency of feeding, the energy density of the foods, diversity of foods in the diet, the safety of the foods and the feeding process (Black, Allen, Bhatta, Caufield, Onis, Ezzati, Mathers and Rivera, 2008; Lutter, 2003).

The small gastric capacity limits the amount of food that a young child can consume during each meal therefore, infants should be provided with frequent, small, nutrient dense feeds throughout the day. Even with recommended breastfeeding practices after 6 months, infants will become stunted if they do not receive sufficient quantities of quality complementary foods (Black *et al.*, 2008). Improved quality of complementary foods is one of the most cost-effective strategies for improving health and reducing morbidity and mortality in young children (Krebs *et al.*, 2007). If adequately promoted and practiced, complementary feeding can prevent up to 19% of all childhood deaths in low-income countries (Wamani, Nordrehaug, Peterson, Tylleska and Tuwmine, 2005). Interventions like counseling on complementary feeding and providing simple technologies to improve food preparation by caregivers of infants and young children are effective in reducing under nutrition in resource poor settings (Jones, Black, Bhutta and Morris, 2003).

Importance of complementary feeding is emphasized by recognition not only that approximately 50% of all childhood mortality is directly or indirectly related to malnutrition, but also that the first 2 years of life represents a critical window of vulnerability according to Fetal/early childhood origin hypothesis (Eriksson, 2005).

1.2 Problem statement

The Uganda Demographic Health survey (2011) reported that only 2.7% of children 6-23 months of age in northern Uganda met the recommended infant and young child feeding practices. By 2008, 38.8% of the children in the region commenced complementary feeding before the age of six months, 48.7% at six months and 12.5% after six months (Olwedo, Mworozzi, Bachou and Orach, 2008). The levels of under-nutrition in children in this region

(24.7% stunting, 12.3% underweight and 3.4% wasting) were high compared to the national averages of 33%, 14% and 5% for stunting, underweight and wasting, respectively (UBOS, 2011).

According to IMC, 2008, levels of malnutrition among infants 6-11 months in Kitgum and Pader Districts in Northern Uganda were high. Stunting was at 27%, underweight at 31% and wasting at 11%. The age bracket of 6-11 months is complementary feeding phase and most infants in the districts are not meeting their recommendations indicated by the high malnutrition levels. Interventions to improve complementary feeding in Kitgum and Pader districts such as; supplementary feeding programs and health and nutrition education were put in place but malnutrition still remains a challenge.

Little in-depth analyses have been carried out to identify the constraints of complementary feeding in infants 6-11 months in this area. This study therefore aimed at understanding the feeding practices of children aged 6 to 11 months, challenges faced by their families in feeding them as well as opportunities for improving prevailing infant and young child feeding practices in Kitgum and Pader districts. Findings of the study would be used in the design of Behavior Change Communication (BCC) strategies especially for community-based nutrition interventions in the two districts. While malnutrition causes are generic, they tend to manifest differently in different communities and therefore may require different approaches to address it.

1.3 Overall objective of the study

To identify the challenges and opportunities for improving complementary feeding practices among infants aged 6-11 months in Northern Uganda.

1.4 Study objectives

1. Assess complementary feeding practices for Infants 6-11 months in Kitgum and Pader districts.
2. Determine levels of dietary intake (energy, protein, Zinc, Iron and Vitamin A) from foods consumed by infants 6-11 months in Kitgum and Pader districts.
3. Determine key factors for improving complementary feeding of infants 6-11 months in Kitgum and Pader districts.
4. Assess adaptability of messages for improving infant and young child feeding (IYCF) practices (Feeding frequency, Feeds density and hygiene during food preparation and feeding) by mothers of infants 6-11 months old in Kitgum and Pader districts.

1.5 The research questions

1. What are the prevailing complementary feeding practices for infants aged 6-11 months in Kitgum and Pader districts?
2. What are the key factors that can help improve dietary intake of infants aged 6-11 months old in Kitgum and Pader districts?
3. To what extent are the mothers adapting specific IYCF messages in Kitgum and Pader districts?

CHAPTER TWO

LITERATURE REVIEW

2.1 Malnutrition and complementary feeding

The first 1000 days of a child's life, from conception to 24 months of age, are the most vulnerable to the risk of malnutrition and also to the long-term effects of malnutrition on mental development, educatability, morbidity and survival, and on productivity (USAID, 2012). Most benefits of nutrition on development would be got if malnutrition was prevented during this period. Unfortunately most malnutrition among children in Uganda happens during this period. About 11% and 13% of infants in Uganda are born with some form of malnutrition (UBOS, 2006 and 2011), respectively. Stunting is apparent among children less than 6 months of age (17% and 16.1%) and increases with the age of the child (UBOS, 2006 and 2011), respectively. The period between 6 to 11 months show exponential rise in all the forms of under-nutrition. Inadequate intakes of dietary energy and protein and frequent infections are well-known causes of this growth retardation (Magala-Nyago, Kikafunda, Mwasaru, Kenjil and Connelly, 2005; Namugumya Ruzaaza, Mwadime, Suthuraman and Okello, 2010).

2.2 Appropriate complementary feeding

2.2.1 Definitions and guidelines

Optimal complementary feeding is a function of timely initiation of complementary feeding, adequate frequency of feeding (at least twice a day for breastfed infants who are 6-8 months old, at least three times a day for breastfed children 9-23 months, and at least four times a day for non-breastfed children), continued breastfeeding and adequate quantities and quality of foods (food diversity and energy and nutrient density) and food safety (Anigo, Ameh,

Ibrahim and Danbauchi, 2010). Sick children should consume at least five food groups a day with enough fluids given regularly and increased levels of attention and care.

Proper complementary feeding practice ensures that the foods given are rich in energy and in micronutrients (especially iron, zinc, calcium, vitamin A, vitamin C and folates), free of contamination (pathogens, toxins or harmful chemicals). Easy to eat and easily accepted by the infant, in an appropriate amount, easy to prepare from family foods, and at a cost that is acceptable to the families (Monte *et al.*, 2004).

Healthy breastfed infants aged 6 to 8 months require approximately 615 kcal/day of which complementary foods should provide approximately 202 kcal/ day; for infants aged 9 to 11 months, the total requirements is about 686 kcal/day and complementary foods should provide about 307 kcal/ day (WHO, 2005). Infants self-regulate their daily intake of energy. They tend to eat less if on high energy-rich foods; although infants eating a high-energy diet (number of calories per unit of volume or weight) tend to have a higher daily intake of energy.

The recommended protein content (grams of protein per 100 kcal of food) for complementary foods is of 0.7 g/100 kcal, from 5 to 24 months (WHO/UNICEF, 1998). Most times, the protein requirements of infants are met when the energy intake is appropriate, except if there is a predominant intake of low-protein foods like sweet potato and cassava (Monte *et al.*, 2004). Lipids in complementary foods should provide approximately 30% to 45% of the total energy required, which is enough to guarantee the

adequate intake of essential fatty acids, good energy intake and uptake of fat-soluble vitamins (WHO/UNICEF, 1998).

As the amount of energy contributed by breast milk declines the total lipid intake also subsides because breast milk is a relatively more abundant source of lipids than most complementary foods (Dewey *et al.*, 2003). A low fat complementary diet will typically not have the energy density required, and especially for children with infections. Complementary foods should provide most of the required iron (97%), Zinc (86%), phosphorus (81%), magnesium (76%), sodium (73%) and calcium (72%) (Dewey and Brown, 2003; Dewey and Adu-Afarwuah, 2008). Foods should vary and be balanced with mixtures containing cereals, tubercles, foods of animal and vegetable origin, and fats should be offered since the consumption of these foods is relatively small among infants/children aged between 6 and 24 months.

Only varied diets guarantee the supply of; energy, protein and micronutrient, enhance good eating habits, and prevent the development of anorexia caused by monotonous foods. Due to low intake of micronutrient rich foods, low bioavailability and frequent infections, micronutrient requirements are often not met. Infants aged between 6 and 12 months cannot eat enough foods to meet their micronutrient requirements and fortified foods are inaccessible to most rural families. Therefore micronutrient supplementation, e.g. of vitamin A are recommended in endemic deficit areas.

Improving complementary feeding therefore remains a paramount factor in improving nutritional outcomes of most children in Uganda. The following sections shall present reviews of the four key aspects of complementary feeding: a) timing of introduction of the

foods, b) nutritional and energy density of the foods, c) amount of foods fed to the infants and frequency of feeding, and d) hygiene and safety of feeds.

2.2.2 Timing the introduction of complementary foods

Complementary foods should be introduced at 6 months. However, studies in African settings have indicated predominantly early introduction of water and complementary foods (CF) (Gupta, Gehri and Stettler, 2007). The same practice is also common in Uganda. A study by Olwedo *et al.* (2008) in IDP camps in Northern Uganda reported that while 49% of the infants had timely complementary feeding, 39% had received other foods/fluids besides breast milk before the age of 6 months and 13% were started on complementary foods after 6 months. In western Uganda, about 21% of 2–3 month-olds were introduced to other foods/fluids in addition to breast milk (Wamani *et al.*, 2005). Earlier introduction of CF does not necessarily improve the child's growth instead the foods tend to displace breast milk, and have clear negative effects on child health (incidence of diarrhea) and thus on child survival (Simondon and Simondon, 1997). When fed on other foods, infants suckle less and the mother produces less breast milk (WHO/UNICEF, 1998). This put the mothers at risk of becoming pregnant because they breastfeed less frequently due to reduced demand by the infant. In addition, early introduction of foods and drinks increases the risk of diarrhea because the foods/drinks may be contaminated through means of administration and storage. The role of diarrhea associated with early introduction of other foods seems to be particularly important perhaps because of its association with mal-absorption of nutrients as well as anorexia and catabolism (Black *et al.*, 2008). Introduction of complementary foods during the first 4 months of life has also been associated with a higher risk of atopic dermatitis and increased likelihood of food allergies or intolerances (Koletzko, 2000).

During the 2006 DHS, only 60% of surveyed children had been introduced to food at the 6 month recommended timing. About 80% of the infants aged 6-9 months in Uganda had started complementary feeding in addition to breastfeeding. A recent review by (Reilly, Ashworth and Wells, 2005) suggests that mean metabolisable energy intake in exclusively breastfed infants at 6 months ranges between 2.2 and 2.4 MJ/d (525–574 kcal/d), and mean energy requirement is approximately 2.6–2.7 MJ/d (632–649 kcal/d). As shown in Figure 2.1, the gap between the energy provided by breast milk and energy needs increases with the age of the child and should be compensated for by consumption of nutritionally adequate, safe and appropriate complementary foods that help meet the additional nutrients requirements when breast milk is no longer sufficient (Butte, 2000; WHO/UNICEF, 2008). From 6 months, breastfeeding – if implemented

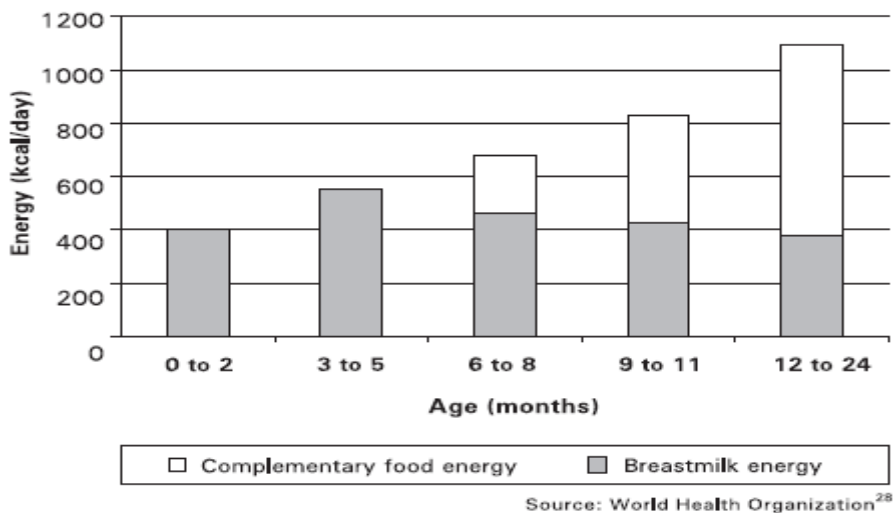


Figure 2.1: The recommended contribution of breast milk and complementary foods compared to the total energy needs of children younger than 2 years by WHO, 1998

Continued breastfeeding after this age is still recommended as it provides protection to the child against many illnesses, and provides closeness and contact that helps psychological development (Lawrence, 2005). In addition to that, in resource poor settings, breast milk is the main source of animal protein to the child as most children of this age are fed mainly on plant sourced foods as complementary foods (Ogunba, 2010).

2.2.3 Nutritional and energy density of foods fed to infants

Lack of nutrient-dense complementary foods is one of the common factors accounting for decline in satisfactory growth pattern in children (Lartey, Manu, Brown, Peerson and Dewey, 1999). The foods need to be of appropriate energy density (about 1 kcal/ml) and nutrient content to be able to provide the essential micronutrients (Martinez, de Zoysa and Glass, 1992). Energy and nutrient density depends on the kinds of foods and processes used for preparing them (Serge, 2001). Many of the traditional complementary foods used in resource poor settings are low in energy and nutrient density (Laswai and Kulwal, 2010). Traditional complementary foods used in Uganda are based on starchy staples, usually cereals such as maize, rice and finger millet and roots and tubers like cassava, sweet potatoes, yams, bananas and plantains (Kikafunda, 2003, Namugumya *et al.*, 2010). Most infants are fed modifications of family foods and the quality of their foods is as good as the family food: commonly prepared from cereals (mainly maize and/or millet), vegetables, tubers (like sweet potatoes and cassava) and matooke/plantain (FAO, 2010). The infant's food is unfortunately made too fluid that it compromises the nutrient density. In a study in central Uganda, the author estimated that the cereal based porridge prepared for and fed to young children had energy density of only 37 kcal/100 grams (Taylor, 1998). The porridge was usually of very "thin" consistency and very rarely (1%) was the porridge of a recommended consistency. The

majority of the mothers, 72 % added water to reduce the viscosity to “drinking” consistency (Kikafunda, 2003).

Taylor (1998) in another study in eastern Uganda found only 17% of samples of complementary foods fed to young children below 24 months of age had an energy density of 100 kcal/100ml or more as recommended by WHO.

The family foods are sometimes unsuitable for infants for much more obvious reasons such as beans having thick skins or fish having bones. In such situations a common practice is to serve the flavorful soup of a stew and restrain the other ingredients (Church, 1979; Namugumya *et al.*, 2010) Staple foods are bulky and less nutrient dense. Infants would need to consume large quantities in order to get adequate energy and nutrients, which is difficult because babies have small stomachs (Islam *et al.*, 2008). The bulkiness can be addressed through germinating cereals or enriching bulky foods with fortificants or with more nutrient rich foods. Malting would also reduce viscosity of the foods and hence a child could consume more at a time (Anigo *et al.*, 2010). However, few of the mothers examined in a study by (Taylor, 1998) in Uganda enriched the porridge with energy or nutrient dense foods like *simsim*, ghee/oil, small dried fish or milk and rarely was the porridge made from fermented/ germinated cereals. And in studies in central and eastern Uganda, Hung (1998) reported that mothers were always hesitant to feeding infants thicker pastes, citing reason that porridge is a “drink” and not a “food” as such its consistency has to be a thin liquid.

Variety in complementary foods increases the chances of the infants meeting the nutrient needs. Complementary feeds in most resource scarce settings lack diversity.

A Multicenter Study on Food consumption reported that 70% of calories ingested by infants between 6 and 12 months are normally supplied by 5 to 8 products.

In the second year of life, the diet is a bit more diversified, including 8 to 11 products, which provide 70% of the energy ingested (Giugliani and Victoria, 2000). WHO recommends that the foods should have foods from at least 3 food groups for breastfeeding children and 4 food groups (including animal milk) for non-breastfed infants. The food groups include, a) infant formula, animal milk, cheese or yogurt, b) foods from grains, banana, roots and tubers, including porridges, c) vitamin rich fruits and vegetables, d) legumes and nuts, e) eggs, meats and fish, and f) foods from oils/butter (UBOS, 2006). Only 58% of breastfed children sampled in the 2006 DHS actually consumed at least three of the food groups assessed in the survey; 44% in the North. Monotony of the diet is long been associated with smaller quantities of foods consumed.

In a recently completed clinical trial in Peru in which two diet periods were observed whereby in one diet period children were offered a single mixture of rice, milk, vegetable oil, and sugar during each of the four meals per day for four consecutive days and the other, second, diet period the children received four different preparations with similar nutrient content, but varied taste, colour and consistency, results indicate that the children consumed nearly 10% more when they received the varied dietary regimen than the other (Serge, 2001). Increasing the variety in the diet is a way of enhancing total dietary intake by children. Nutrition education and counseling has been shown to increase consumption of key foods but nutrition education alone did not show attainment of the nutritional needs without also intake of fortified foods (Dewey and Adu-Afarwuah, 2008).

2.2.4 Amount of foods fed to the Infants and the frequency of feeding

A key indicator of adequate complementary feeding is the frequency of feeding. The stomach capacities of infants are small, and so they need to eat small frequent meals that are energy and nutrient dense. The quantities fed per meal should be gradually increased with age. The amount of posho consumed by an infant depends on child's aptitude for ingesting food (i.e., gastric capacity, appetite, and possible food aversions), feeding habits, and gruel characteristics, particularly organo-leptic ones such as consistency, flavour or aroma (Serge, 2001). Assuming a gastric capacity of 80-90 mls and an energy intake of at least 0.8 kcal/g, breastfed infants aged 6-8 months of age need 200 kcal per day of complementary foods and those aged 9-11 months need about 300 kcal per day. However, children in Africa consume little amounts of food compared to what is recommended. From ten surveys carried out in five African countries (Burkina Faso, Cameroon, Congo, Guinea and Senegal), it was reported that the average amount of gruel consumed per meal ranged between 6.2 and 20.6 g per kg of body weight with an average of about 15 g per kg of body weight (Serge, 2001). If energy content or the amount of complementary foods per meal is low, or if the infant has been completely weaned, a higher frequency of meals may therefore be necessary. Adequate energy intake can be achieved with fewer meals if the energy density of the food is increased (Islam *et al.*, 2008).

WHO recommends two to three complementary meals a day for breastfed infants between 6 and 8 months of life and three to four meals a day for those between 9 and 24 months, with additional nutritious snacks (pieces of fruit or bread, couscous, homemade cake, cassava) once or twice a day at 12 months (PAHO/WHO, 2003). Non-breastfed infants should be fed at least four times a day.

However, normally young children eat at the same times as adults in a household: the frequency a child eats is the same as the number of meals eaten in the household, and it varies by region and season (Namugumya *et al.*, 2010)).

National Household Survey 2005/06, reported that 18% of households in northern Uganda ate only one meal a day, compared to 5% in the eastern and 4% in the western regions (UBOS, 2006). Actually the DHS 2006 reported that only 16 percent of breastfed children (aged 6-23 months) in northern Uganda (17% in the IDPs) were fed the minimum times or more; the national average was 40%. Catholic Relief Services (CRS) also documented a similar feeding pattern, where 49% of children aged 6-23 months in the northern region were fed only twice or less a day (CRS, 2007). In most cases, there was no specific time set aside for cooking or feeding young children. With the low frequency of child feeding, especially in the northern region, it is unlikely that the daily energy and nutrient needs are met.

It should be underscored that complementary foods are not supposed to replace (but complement) breastfeeding. The frequency of breastfeeding should be maintained: the infant will naturally begin to nurse less with the introduction of complementary feeding. Therefore, the number of meals should be managed so as not to substantially reduce the amount of breast milk ingested by the infant. Nutritious snacks are time-saving and contribute less to milk displacement (Monte and Giugliani, 2004).

2.2.5 Food hygiene and safety

Careful hygienic preparation and storage of complementary foods is crucial to prevent contamination. Personal hygiene plays an important role in feeding infants. If cleanliness is not observed complementary foods may do more harm than good to the child by introducing

infections to the infant. It is therefore important that all foods prepared for young infants are handled in a way that they are free from any germs.

A Tanzanian study on hygiene of complementary foods reported that all sources of water examined failed to meet the guidelines of the World Health Organization (WHO) for quality of drinking-water. Complementary food samples consistently had higher means in aerobic bacteria ($p = 0.002$), coliform ($p = 0.006$) and Enterobacteriaceae ($p = 0.019$) counts.

Although the mean log bacterial counts were lower in food samples collected from households where mothers are the persons who fed the child, there was no statistical difference in bacterial counts among the different caregivers or among the different feeding modes (Kungu'u, Boor, Ame, Ali, Jackson and Stoltzfus, 2009).

WHO recommends to Practice good hygiene and proper food handling by a) washing caregivers' and children's hands before food preparation and eating, b) storing foods safely and serving foods immediately after preparation, c) using clean utensils to prepare and serve food, d) using clean cups and bowls when feeding children, and e) avoiding the use of feeding bottles, which are difficult to keep clean.

2.3 Factors likely to affect complementary feeding patterns

Decisions on feeding of young children are often guided by multiple of factors. The main factors are likely to include a) beliefs on feeding, which are based on culture, comments and information from peers and relatives, b) knowledge on infant feeding c) perception that the infant needs additional foods to counteract signals of hunger, reduce crying and be able to sleep throughout the night d) the health of the child or mother may also influence the kinds of foods given, the amounts and frequency of feeding, e) lack of maternal time and other

resources needed to prepare foods for the child. Some of these factors are shown in Figure 2.2 and are described in detail in the proceeding sub-sections.

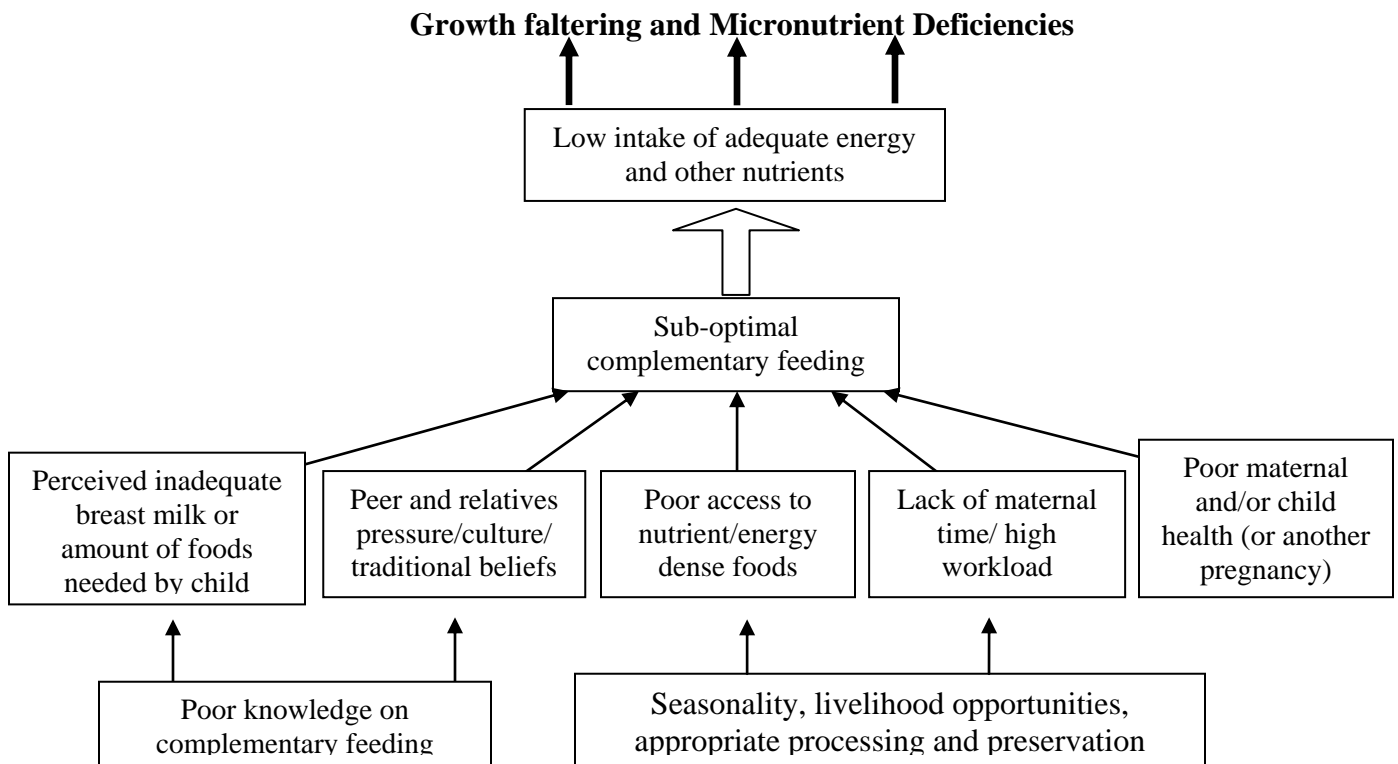


Figure 2.2: A conceptual framework of plausible causes to sub-optimal complementary feeding in Uganda adopted from different Literature

2.3.1 Knowledge about complementary feeding

A study among black women in Maryland, USA cited reasons for the early introduction of solids to infants as; big infants are considered to be healthy and solids are regarded as having more nutritional value and ability to satisfy infants, compared to formula (Black *et al.*, 2001). The mean age for starting complementary feeding is sufficiently modified by the educational levels of the mothers. Most illiterate mothers started at 5.4 months against 4.8 months when the mothers was a university graduate. Many women introduce solids late to infants so as to use the prolonged exclusive breastfeeding as a family planning method while mothers from high-income groups believe that milk is complete food and so milk and milk products are

given to children in 6-12 months instead of semi-solids, CF (Agostoni, Decsi, Fewtrell, Goule, Kolacek, Koletzko, Michaelsen, Moreno, Puntis, Rigo, Shamir, Szajewska, Turck and Goudoever, 2008).

Urban mothers, the high income groups who are more educated and informed on good infant feeding were found to delay the introduction of other foods at 5-6 months compared to rural mothers at 1-2 months (Shamima, 2010, Hussein, 2005).

A recent review by Dewey *et al.* (2008) showed that education/counseling on infant feeding had modest effects on weight (mean effect size = 0.28; range -0.06, 0.96) and linear growth (mean effect size 0.20, range 0.04, 0.64), however, this varied depending on factors like socio economic status of the study infants and the programmes to which they were attached. In several studies, the impact of providing a complementary food, in combination with nutrition education, was evident only in the younger children. This underscores the importance of beginning complementary feeding programmes during infancy, when nutrient needs relative to energy intake are the highest and the ability of the child to respond to a nutritional intervention is the greatest. Knowledge alone is not sufficient to improve complementary feeding except in combination with other interventions like providing additional food and a strong emphasis on feeding nutrient-rich animal source foods.

In Uganda, women living in a semi-urban area and women older than 26 years were more likely to introduce additional liquids before 6 month.

Early introduction of liquids and solid food was, however, not associated with education and occupation (Poggensee, Schulze, Moneta, Mbezi, Baryomnsi and Harms, 2004). The early introduction of complementary food in term infants has also been reported to be associated

with low maternal age, younger or primiparous mothers were not more likely to perceive their infant to be hungry than older or multiparous women (Scott *et al.*, 2009). This is probably due to their low knowledge on infant feeding.

Mothers who attain education level below secondary school tend to engage in inappropriate child-feeding practices, for instance, uneducated mothers are more likely to wean children directly onto the staple at a very early age. However, illiterate mothers also tend to improve their child-feeding behavior when they are taught how to appropriately feed their children (Kabahenda, 2002).

2.3.2 Seasonality/Livelihood opportunities and appropriate processing and preservation technologies

Having the right foods at the household level, either because you produce them or because you buy them in the market is not enough; people need to know how to process and store excess food for off seasons. Traditional food processing techniques form part of the culture of people but this has been lost over years even though they contribute enormously to food availability in households (Aworh, 2008). Farmers in many developing countries are operating in an environment of inadequate infrastructure like roads, electricity, and communication; poor soils; lack of storage and processing capacity; and little or no access to agricultural technologies that could increase their profits and improve their livelihoods (Von Braun, 2008a).

Some of the processing and preservation techniques which are employed in making complementary foods include; dry milling, wet milling, smoke drying and fermentation used to extend shelf of the food and prevent spoilage.

In Uganda most farming households have for example abandoned the strongly culturally-determined custom of storing food for use in times of scarcity, preferring instead to secure their livelihood by saving the cash value of the crops.

It is usually hard to keep this compared to actual food hence the periods of intense food shortage for the entire households (Byaruhanga and Opedun, 2010). Traditional storage facilities like granaries are rarely in use nowadays especially in Northern Uganda where they were destroyed during the LRA war. Their reconstruction and use seem to be taking a very longtime meaning produced food surplus are sold off leaving families with very little to fend for during food off seasons.

2.3.3 Perceived inadequate breast milk or amount of food needed by the child

Asian studies on Complementary feeding confirm perceived low breastmilk quantity as a widely stated reason for early introduction of complementary foods. Mothers in Kuwait reported that they introduced complementary foods to infants earlier than expected because of the insufficient amount of breastmilk they have got (Haider, Islam, Kabir and Habte, 1996). In Uganda, the main reasons for early introduction of complementary fluids given were ‘little milk’ 9.8% ‘no time’ 1.9% while in Tanzania, ‘little milk’ as reason for early introduction of CF was mentioned by 14.5% of the study participants (Poggensee *et al.*, 2004).

A review by Fewtrell *et al.* (2007) showed that though some mothers succeed in exclusively breastfeeding their infants until 6 months of age or beyond, many others report introducing other foods before 6 months. The reason most frequently given for the “early” introduction of solids is that the mother considers the infant to be hungry and not satisfied by breast milk

alone. Mothers often look at their infants for cues regarding hunger and satiety and reason that with solid foods their infants will feel satisfied and will cry less and sleep through the night. The mothers therefore translated that their infants were getting insufficient breast milk hence the reasons for all the unsettledness (Scott *et al.*, 2007).

In many developed countries, exclusive breastfeeding for 6 months remains relatively uncommon. It is possible that mothers who continue to exclusively breastfeed their infants to at least 6 months differ from those who do not, either in having a slower growing infant with lower energy requirements, higher breast milk volume production, or higher breast milk energy content.

2.3.4 Peer and relatives pressure/cultural/traditional beliefs

Many infants even in developed countries, particularly those with adolescent mothers, receive solid foods (often cereal mixed with formula in a bottle) and liquids other than formula or breast milk in the first few weeks of life (Tatone-Tokuda, Dubois, Manon and Girard, 2009, Black *et al.*, 2001). Decisions on early feeding are often guided by grandmothers and influenced by beliefs that infants need complementary food to counteract signals of hunger, reduce crying, and sleep through the night (Black *et al.*, 2001).

However, early complementary feeding does not increase the likelihood of nighttime sleeping and may increase the likelihood of feeding disorders, especially if parents introduce developmentally inappropriate food or feeding techniques before children have acquired the necessary neuromuscular skills. Low-income adolescent mothers are a particularly vulnerable group because they have little experience themselves and are often dependent on their mother (infant's grandmother) for guidance (Black *et al.*, 2001).

Grandmothers play important roles in infant feeding decisions, particularly related to the early introduction of complementary foods though they could also be bad influence especially in terms of encouraging some undesirable child feeding behaviors (Black *et al.*, 2001, Sharma and Shuddaba, 2006). This is supported by study by Gupta *et al.* (2007) in Northern Senegal which found out that early introduction of water to infants was often dependent on tradition. Cultural issues also influence nutrition of infants since the distribution of food and food taboos are culturally determined along age and gender lines. A Ugandan study confirms how culture affects when solids are introduced and what is fed to the infants. Women belonging to the ethnic group of the Bakiga were less likely to introduce liquids before month 6 while participants belonging to ethnic groups other than Bakiga and Batooro had a tendency to introduce solid food earlier; however, the result was not statistically significant (Poggensee *et al.*, 2004). And still in western Uganda fruits were regarded as food for the children hence enabling them to get the vitamins, minerals and other nutrients they require, while among the Karamajong, a pastoral community in north eastern Uganda, the culturally accepted food is milk in blood and sorghum therefore an infant will have to eat that or be introduced much later to complementary foods (Byaruhanga and Opedun, 2008).

Observations have been made that food distribution within the family does not always favor children, even in richer societies.

Families may deprive children of a diverse diet because marketing and misinformation leads them to believe that children need special and expensive foods. In most Ugandan societies women are traditionally not allowed to eat chicken or eggs. This largely affects the infant

because in most cases what a mother eats is what the infant eats and so the denial of this for a mother is the same as denying the infant these things.

Most studies have focused on the effect of the timing of introduction of complementary foods on growth, rather than the effects of specific complementary foods. Every community has a staple food which is the main food eaten.

Porridges prepared from the staples are often used as early complementary foods. However, these are usually watery and contain little energy and few nutrients.

2.3.5 Access to nutrient/energy dense foods

The quality of food is just as important as the quantity during the vulnerable periods. Thus, priority should be given to ensure that infants receive a diverse diet that includes the most nutrient-rich foods (such as animal source foods, fruits and vegetables) as well as fortified products as needed (e.g. for infants 6-12 months of age (PAHO/WHO, 2003). Food unavailability, however, makes it hard for that to be achieved. Community and national-level action is needed to increase the food availability and make agriculture recognize better its role in providing not just enough food to feed people but also enough of the quality, nutritious foods, and that these are made more accessible to the poor.” utilization of low-cost, nutritionally complete complementary foods and/or fortified products, as well as safe water must be encouraged.

In Uganda rules of land inheritance and access to land are culturally determined through lineage or gender; this has an impact on food production and access to food. Communally, household and individually-owned land, all determine what is produced and how it is

distributed amongst the beneficiaries (Byaruhanga and Opedun, 2010). The sharp increase in food prices over the past couple of years has raised serious concerns about the food and nutrition situation of poor people in developing countries especially in terms of access (Africa News, 2011). Higher food prices lead poor people to limit their food consumption and shift to even less-balanced diets, with harmful effects on health with infants most affected considering their needs.

2.3.6 Lack of maternal time/high maternal workload

The presence of maids in homes in developing countries has contributed to a decline in breast-feeding and a significant increase in bottle-feeding. The duration of breast-feeding is shorter and bottle feeding is introduced earlier. This problem was observed to be more evident among educated mothers who are usually working and are separated from their infants for long periods (Al-Awadi, and Amine, 1997). The place of residence also affects the age of introduction of solid foods, with urban mothers introducing these at an earlier average age than mothers residing in rural regions. This could be due to the fact that rural mothers breastfeed for a longer duration and hence delay the introduction of foods/fluids (Batal, Boulghourjian and Akik, 2010).

Hussein (2005) established that women participation in food production in Tanzania had both positive and negative effects on the nutrition status of children. This was because although there was an increase in household food supply, mothers had less time for cooking and care of young children. When food is prepared once, it is fed several times, the infants are at risk of getting diarrhea due to bacterial contamination hence mothers are hesitant to introduce CF for fear of not being able to meet the required practice.

2.3.7 Maternal and or child's' health

Maternal depression leads to cessation of breast feeding, resulting into early introduction of other foods other than breastmilk. In a study by Taj and Sikande (2003), it was observed that majority of the mothers who stopped breast feeding reported, that their depressive symptoms preceded the cessation of breast feeding. Up to 40% of women stop breast feeding in the first three months after delivery due to depression.

While the mother is sick, breastfeeding is reduced due to pain and discomfort during breastfeeding and in most cases she loses appetite for food and becomes selective in what she eats. According to the DHS, 2006, 15% of children below five years had symptoms of ARI and 41% had fever in the two weeks preceding the survey. The infants also lose appetite while sick hence may not eat certain foods which would lead to nutrients deprivation. Appropriate feeding during and after illnesses is important to avoid weight loss and other nutrient deficiencies. For infants older 6 months both breastfeeding and complementary feeding should continue during illnesses. Restriction or dilution of food should be discouraged.

2.4 Ways of improving complementary feeding in resource poor settings

Mixing complementary foods is the best way to make certain that children get enough energy, protein and micronutrients for healthy growth and development (Ashworth, 2002). Infants can be fed family foods, provided that consistency and energy content are appropriate. Other foods must be eaten with the staple food in order to fill the energy and nutritional needs.

The types of foods that fill these needs best are: Pulses (such as peas, beans, and groundnuts) and oil seeds (such as sesame seeds) which are good sources of protein. Some, such as groundnuts, bambarra, soybeans and oil seeds, are rich in fat so are also high in energy.

Foods from animals and fish are rich sources of many nutrients. Organ meat (such as liver, heart, and kidneys), as well as milk, yoghurt, cheese and eggs are good sources of protein. Foods made from milk and any food containing bones that are eaten (e.g. small fish, canned fish, or pounded dried fish) are good sources of calcium, needed to build strong bones. Dark green leaves and orange-colored fruits and vegetables are all rich sources of vitamins A and C. Oils, fats (such as margarine, butter, ghee) and sugars are concentrated sources of energy. Adding one teaspoon of oil or fat to a meal gives extra energy.

During a day, a good mixture for a meal to be fed to the infant is: A staple + a pulse + an animal food + green leaves or an orange-colored vegetable or fruit. All these foods can be used to make a meal interchangeably examples: Staple + pulse + green leaves at one meal then Staple + animal food + fruit at another meal (Ashworth, 2002). Different food processing techniques like fermentation, sprouting and enrichment can be used to improve complementary foods. A Tanzanian study reported processed foods are not always superior to the unprocessed foods as complementary foods.

Random samples from each month's CF production (for processes like fermentation, sprouting) unit and unprocessed CF had an energy, fat, and protein content that did not differ. However, the porridge prepared with the processed CF had a greater energy density, significantly higher iron solubility, and a lower concentration of phytates compared with the

porridge prepared with the unprocessed CF. There was a small but significant reduction in total iron content in the processed CF compared with the unprocessed CF, probably due to leaching in the course of processing these foods (Mamiro, Kolsteren, Camp, Roberfroid, Tatala and Opsomer,., 2004, Aworh, 2008). Apart from improvement in protein content and quality, co-fermentation also prevents flatulence.

Infant formula or follow-on formula may be used in addition to or instead of breast milk during complementary feeding. Cow milks' introduction should be delayed for the main reason of preventing iron deficiency because cow's milk is a poor iron source. The recommendations on the age for introduction of cow's milk should take into consideration traditions and feeding patterns in the population, especially the intake of complementary foods rich in iron and the volume of milk consumed. It is acceptable to add small volumes of cow's milk to complementary foods, but it should not be used as the main drink before 12 months. The recently updated PAHO/WHO (2001) guidance for complementary feeding of the breastfed child aged 6- 23 months includes dietary diversity as a specific recommendation for the reason that infants and young children are more vulnerable because they need energy- and nutrient dense foods to grow and develop both physically and mentally and to live a healthy life.

Lack of diversity is particularly a severe problem among poor populations in the developing world, where diets are based predominantly on starch staples and often include a few or no animal products and only seasonal fruits and vegetables. A review of the Demographic and health survey data of 11 countries, 6 of which are African countries by (Arimond and Ruel 2004) showed low mean eating frequency of less than two in most countries and a low mean

dietary diversity. A very high percentage of children from the African countries scored in the lowest diversity group (having consumed 0-2 food groups on 3 or more days the previous week).

A significant association was found to exist between dietary diversity and HAZ as a main effect in 7 of the 11 countries studied, this confirms that diversification of complementary foods is generally associated with child's nutritional status even when household wealth and welfare factors are controlled for. However, depending on the diet patterns in a given case, high diversity scores may be more or less nutritionally meaningful. For instance, if many food groups are given but in extremely small amounts, diversity scores are less nutritionally meaningful.

The government of Uganda recognizes malnutrition as one of the major public health problems and has advocated for nutrition education at the national and local levels to improve the health status of all citizens (UFNC, 2000). Since a lot is not yet known about the practice on ground on infant feeding practices especially during complementary feeding period most especially in Northern Uganda the study will through triangulation discover what is currently happening in the communities and the gaps so that trainings and other interventions can be designed and put in place.

CHAPTER THREE

METHODOLOGY

3.1 Study area

The study was conducted in Kitgum and Pader districts in Northern Uganda. Kitgum and Pader districts were among those that suffered effects of the 20 years atrocities of the rebels of the Lord's Resistance Army (LRA) and tribal cattle raids from the Karamojong (Mutambi, Hasunira, and Oringa, 2007).

Since 2006, there has been a process of facilitating resettlement of the people from these areas who were in the IDP camps to their original homes. At the time of the study, some people were still living in transitional resettlement sites and others were fully resettled in their original homes (Petty and Savage, 2007).

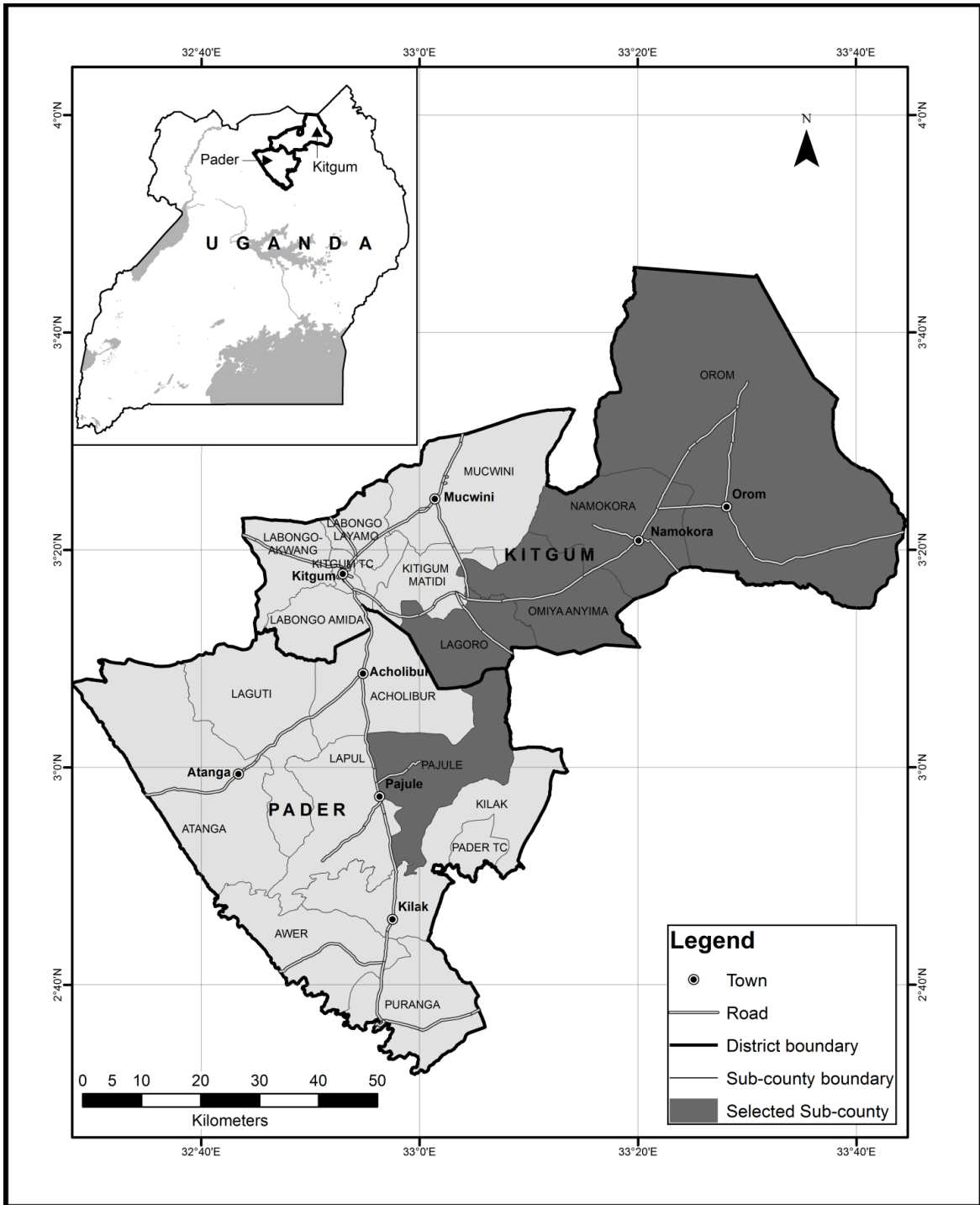


Figure 1.1: Map of Uganda showing locations of Kitgum and Pader Districts (as they were in 2008) and the study areas

The main agro ecological zone in the two districts is savannah grassland. The common economic activity in the districts was agriculture with main emphasis on food crops such as millet, sweet potatoes and beans, vegetables such as cabbage, tomatoes and onions. Cash crops include *simsim*, sunflower and cotton. There are a number of non-governmental organizations in this area; Mercy corps/International Medical Corps, World Vision, AVSI, VEDCO, War Child, Lutheran World Federation etc which are by now transitioning their services from relief to Developmental Assistance (Namugumya *et al.*, 2010).

Most medical services are got from government health centres mainly health centre II and III. Kitgum district has two hospitals namely; Kitgum government hospital and St. Josephs' Missionary Hospital while Kalongo hospital in Agago district is the hospital serving Pader district. The study locations were purposively selected to represent different ecological zones in the districts and areas with high prevalence of under-nutrition. Six sub-counties were selected for the study; four from Kitgum district (Orom, Namokora, Lagoro and Omia Anyima) and two from Pader District (Pajule and Wol). These sub-counties were selected for the purpose that they are areas where International Medical corps is implementing a community based nutrition project.

3.2 Study design

The study was a cross-sectional descriptive survey using mainly qualitative methods supplemented by some quantitative methods. The qualitative and quantitative data were collected concurrently.

All the interviews were conducted on face to face basis by the interviewers. A sample size of 100 households with infants 6-11 months was used for 24hr recall dietary recall adopted from

UFCS, (2008) to estimate the nutrient intake, diet diversity for the infants and food preparation methods in the area. At least 6 infants 6-11 months old were randomly selected from each village in the study area. A sample of 100 households with infants 6-11 months was estimated to be enough to give a clear picture of the situation. A sub-sample of 15 households from the 100 households participated in Trials of improved Practices (TIPs). The number 15 was taken basing on recommendations by Manoff groups. Infants' ages were assessed and verified through health cards or recall taking precautions to minimize errors.

Mobilization and appointments were made a day before for the FGDs and KII and all the interviews were recorded using Sony voice recorders. Data enumerators were guided by the VHTs to access the households of the selected infants for the administration of the questionnaires. At the end of every interview day, interviewers had a brief meeting to share out the days findings and where necessary adjustments were made accordingly.

3.3 Sampling methods and procedures

Purposive sampling was used for selecting key informants and focus group discussion members. Purposive sampling method was used on the basis that the community leaders, Village health team members and mothers/caregivers of infants 0-12 months have knowledge on infant and young child feeding practices subject. They also have roles which they play in health and nutrition sector, agriculture, traditional child care practices and other cross-cutting issues such as alcohol production and consumption, teenage pregnancy, civil insecurity within the communities. A village household list was used for randomly selecting infants 6-11 months old.

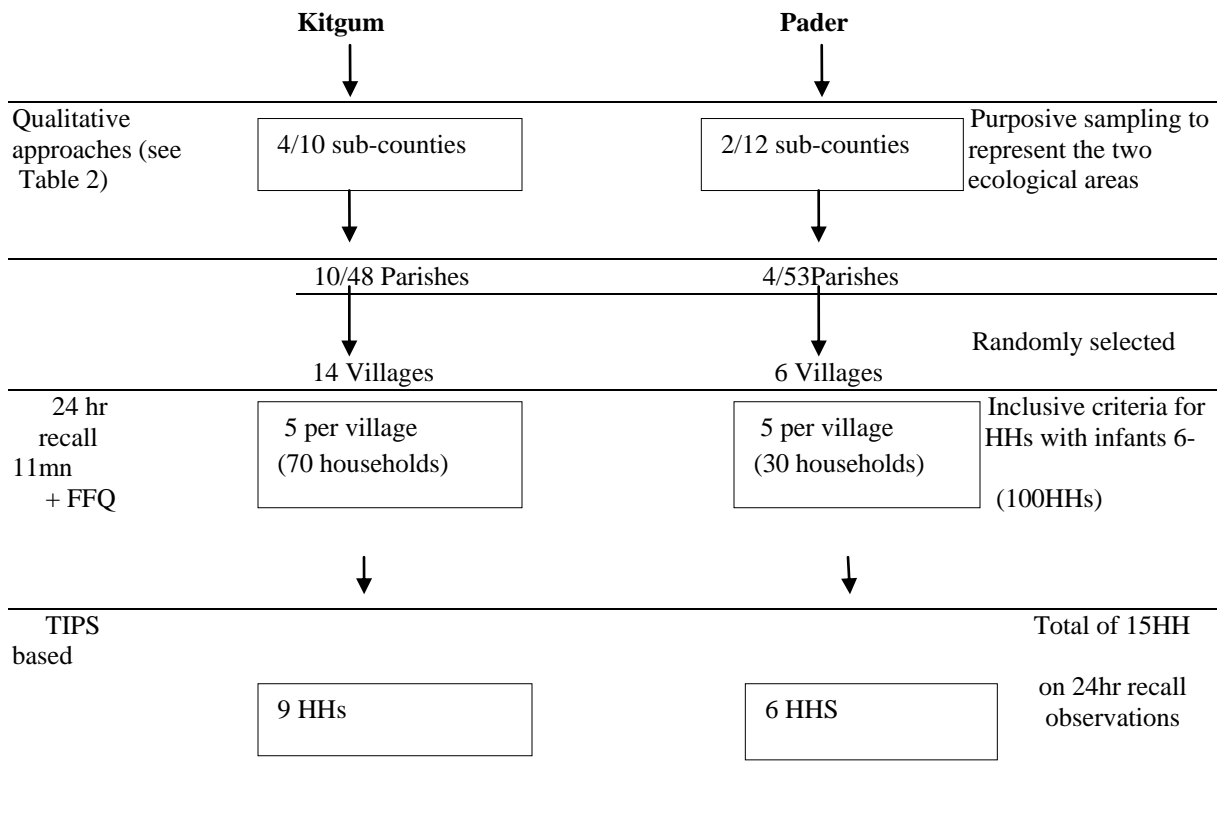


Figure 3.2: Illustration of sampling methods and procedures

3.4 Data collection techniques and tools

Data collection tools were designed to obtain information from different levels and interview guides were developed prior to the field visits as indicated in Table 3.1.

Table 3.1: Data collection tools

Method	Tools	Respondents
Qualitative	<ul style="list-style-type: none"> • Focus group discussions guidelines • Key informants interview guidelines • Semi structured interview questionnaires • Observation checklists • Trails for improved practices questionnaires 	<ul style="list-style-type: none"> • Mothers /caregivers of infants 0-12 months, Fathers and grandmothers • VHTs, Community Leaders, mother/caregivers of infants 0-12months • VHTs, Community Leaders, mother/caregivers of infants 0-12months and Fathers • Mothers /caregivers of infants 6-12 months • Mothers/caregivers of infants 6-12months
Quantitative	<ul style="list-style-type: none"> • Gibbson multi-pass 24hr recall 	<ul style="list-style-type: none"> • Mothers/caregivers of infants 6-12 months

A total of 8 FGD were conducted; 6 for mothers/caregivers of infants 0-12 months and 4 each for fathers and grandmothers. A focused group ranged from 8 to 12 participants and each session lasted between 1 to 2 hours. Each FGD was led by a moderator assisted by a note taker. Oral consent of all the participants was sought before the interview and all the interviews were recorded. Two KII were conducted for each of the respondents' categories per district and a tape recording made of it as well. A total of 7 SSI were conducted; 2 each for VHTs and Community leaders, 4 for mothers/caregivers of infants 0-12 months and 1 for Fathers. These were done per district.

Focus group discussions focused mainly on Infant and young child feeding aspects like; age at introduction of other foods other than breast milk, feeds recipes and modifications, diet diversity, decision making and household resource allocation and general perception of infant feeding within the communities while SSI and KII focused mainly on;

1. Gender considerations; Women's time and competing responsibilities to child care (housework, reproductive roles, and food production roles), decision making process and control over resources.
2. Male involvement; Role in and nature of support to mothers for child care, infant feeding, child health, Perceptions of gender relations and how this may have changed.
3. Opportunities in terms of nutrition and livelihoods.
4. Roles and influence of grandmothers and other family members in maternal and infant care.

The 24hr recall tool was used to collect data on; types and amounts of food consumed by the infants, feeding frequency and food recipes. Trials for improved practices piloted with the mothers on the adoption of recommendations of IYCF practices specifically; feeding frequency, amounts of food fed to the infants and hygiene during food preparation and feeding.

3.4.1 Procedure for the Gibson multi-pass 24 hr dietary recall

The Gibson multi-pass 24hour dietary recall was conducted for 96 respondents and reflected the feeding practices of the infants from the previous day from the time they woke up to the time they went to bed in the evening of the same day. All foods given during the course of the night in case the infants were hungry were included. The process of 24 hour assessment was done for 3 days with the first day utilized for random selection of infants (6-11 months) from 6 households per village. The actual exercise was done for five infants with the sixth infant as substitute incase a respondent among the five was not available for one reason or the other on the survey day.

Demonstrations on estimation and measurement of portion sizes of different foods were done with the mothers using dietary scales, water, rice, salted replicas of actual foods, and some photographs with different sizes of foods that were used to help estimate portion sizes.

The mothers/caretakers were asked to prepare the meals themselves and make sure that the child ate all the main meals in their company or be done by someone who would be present on the recall day to assist with the measurements. On the second day (observation day), mothers/caretakers had to observe all the eating behaviors of the selected infants and ensured that they are in position to explain these to the interviewer. The research team visited the household on the third day to administer the questionnaires to the mothers/caretakers. These included questions on breastfeeding practices, nutrient supplementations, infant illnesses and food frequency.

During the interview process estimation of quantities of foods consumed by the infants was done as the mother/caregiver mentioned the foods. There were also questions qualifying the infants' appetite as usual or unusual.

3.4.2 Procedure for trials of improved practices (TIPs)

Three visits were made in 15 households out of the 97 with infants 6-11 months that had participated in the 24 hr dietary recall and were lacking in certain infant and young child feeding practices. The first visit to the household was done when the team was conducting 24 hour recall and basing on the 24 hr recall data and some observations the household was asked to participate in the exercise. Before leaving the household, a date was agreed upon when the mother was to be met again. Key issues that needed addressing in IYCF were identified and recommendations made against them for TIPs. During the second visit (at

least 2 weeks from the first visit) counseling and negotiations were made with the mother to select options from solutions to try out in solving the identified problems. The mother was asked to select at least 2 or a maximum of 3 options for the identified problem.

Before leaving the household, it was ensured that the mother clearly understood what they were meant to do; a reminder note was made with the options and left with the mother. In the event that she does not read and write, she was requested to avail the remainder note to someone who would read it out to her. Where there was someone in the same households they were asked to remind the mother on the agreed upon actions. The researcher noted all the agreed upon actions for improving IYCF in a note book. A date was then set with the mother for the third visit (8- 10 days after the second visit). On the third day, the mothers were asked if they had tried out the recommended practices (see Annex 4). If they had, they were asked about their infants' responses, the mothers' perception and whether the practice could be adopted and if not, why it was not possible.

3.4.3 Validation of study tools

All the questionnaires and interview guides were pre-tested in a sub-county called Pajimo, Kitgum district by the enumerators and a feedback meeting was done. Areas in the questionnaires which proved difficult or were not giving valid data were adjusted.

3.5 Quality assurance of data

The 24hr dietary recall data was collected by a team which had received training on Gibson multi-pass 24hr recall procedure from the Uganda Food Consumption Survey team and had participated in the National Survey. All the collected data was checked and verified daily in the field and upon return from the field for eligibility and completeness.

Focus group discussions, Key informant interviews and Semi structured interviews facilitators had University level of education and excellent knowledge of the local dialect (Acholi/Luo). They were trained for 3 days by a group of qualitative technique experts from the Department of Psychiatry, Makerere University. At the end of every interview day interviewers had a brief meeting to share out the days' findings and where necessary adjustments were made accordingly. All interviews were recorded using Sony voice recorders.

3.6 Analysis of the qualitative Information

All recorded audio discussions from FGDs; KIIs were first transcribed then translated into word document. Codes were developed and defined for analysis based on study objectives and interview questions. Atlas-Ti version 6.1.1, an electronic package for qualitative data was used to retrieve information related to the given codes. The coded and retrieved information was interpreted by different people to ensure thoroughness and validity in the conclusions arrived at.

3.7 Analysis of quantitative data

The 24-hour recall data was entered into MS Excel where energy and nutrient conversions were done using the adaptation of Tanzanian Food Composition Tables (Lukmanji, Hertzmark, Mlingi, Assey and Ndossi, 2008). These tables were preferred because they are closer to the Ugandan situation and were previously used by Uganda food consumption survey team. Uganda does not have her own Food Composition Tables. The data was exported to Statistical Package for Social Scientists version 12.0 (SPSS) where analyses were done and means and standard deviations derived. Pearson's bivariate correlation was done to

establish how the different variables relate to one another and these were; age group of the infants, feeding frequency, dietary diversity and nutrient intake.

After computation of the total kilocalories in the different foods fed to the infants using actual amounts consumed, the energy density of these foods were calculated using the total weight of the food (Vernarelli, Mitchell, Rolls, and Hartman, 2013).

Dietary Energy Density_{food-only} = food energy (kcal) / food weight (g)

From this tables of energy density were constructed.

Trials for improved practices data was analyzed by comparing responses from the different households that is before and after the intervention. The responses were then grouped according to the questions asked.

3.8 Ethical approval and considerations

The study was approved by Makerere University, school of food technology, Nutrition and Bio-engineering, Department of Food Technology and Nutrition. Permission to conduct the study in the respective sub-counties was obtained from the Kitgum and Pader Chief Administrative Officers respectively. Only participants who consented to take part in the study were recruited. They were also assured of confidentiality of their information and during data analysis; codes were used in place of personal information like names.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 Respondents' profile

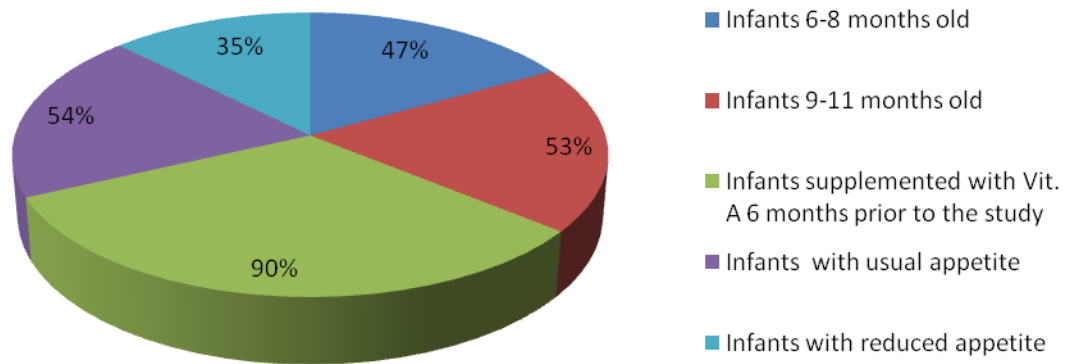


Figure 4.1: Profiles of the respondents (infants 6-11 months)

Average age of the infants was 8.7 ± 1.7 months

4.2 Feeding practices of infants aged 0-11 months in the study area

Table 2 shows the common feeding practices among mothers and care takers of infants (0-11 months) in Kitgum and Pader districts.

Table 4.1: Feeding practices for infants 0-11 months in the study area

	0-2/3 months old	3-5 months old	6-8 months old	9-11 months old
Foods and drinks given	<ul style="list-style-type: none"> • Breast milk • Plain water • Water-sugar/glucose solution • Thin/watery porridge • [rarely is cow's milk given] 	<ul style="list-style-type: none"> • Breast milk • Water-sugar solution • Thin porridges (made from millet and sometimes enriched with simsim or groundnut paste). • Soups from family foods like beans, peas • Soups enriched with simsim and vegetables [except those known to be sour/bitter] 	<ul style="list-style-type: none"> • Breast milk • Porridges(thicker) (made from millet and sometimes enriched with simsim or groundnut paste) • Mashed beans and peas or soups from these sauces • Posho/stiff porridges (made of millet, sorghum, maize flours) • Vegetable leaves blended with simsim or groundnut paste 	<ul style="list-style-type: none"> • Breast milk • Family porridge [no modification] • Family solid foods like; Posho/stiff porridges (millet, sorghum, maize flours), cow pea leaf sauce, silver fish, beans [Any meal prepared for the family is fed to the infant] • Snacks like cassava mostly eaten with Tea • Fruits like Mangoes, oranges(when in season)
Why food is given at this age	<ul style="list-style-type: none"> • Breast milk may take some days to come after delivery and the baby seems hungry • To quench the baby's thirst and cool the baby, especially when sick—has fever • To keep the baby from crying and help the baby sleep • To give the baby strength • Advised by people in the community that the baby needed additional food • Mothers do not have enough milk 	<ul style="list-style-type: none"> • Give the baby extra strength and resistance against any kind of diseases • Baby want to eat whenever parents are eating—they cry if refused • Apart from sickness, it is also a way of orienting the baby to get to know how to eat or start taking any kind of food [prepare the baby incase they are to be left with others or mother falls sick] • Medical concerns especially maternal sicknesses—fear to pass the disease to the baby or baby just refuses breastfeeding 	<ul style="list-style-type: none"> • Told at the health centre that at 6 months the baby is able to eat and should be introduced to foods • Supplement the baby with other foods to improve their strength • They have teeth and can eat well—they also like the food • Insufficient breast milk and baby not having enough • Baby is cared for by others and needs food they can feed the baby • Everyone expects you to be feeding the baby normal food 	<ul style="list-style-type: none"> • Breastfeeding frequency is reduced • The baby's systems are developed to deal with the family foods e.g. the teeth have started growing • The baby is more mature; they want sweet or salty things [some babies even start refusing foods and want the sweet breast milk] • Mother maybe pregnant and must stop breastfeeding • Mothers are too busy and expected to work more and have no time to cook other foods

Feeding practices varied from different age groups though there were some overlaps in certain age groups. From the focused group discussions, 75% of mothers initiated breastfeeding with colostrums within two hours of giving birth and 60% of the infants were exposed to pre-lacteals. Solid/fluids were introduced between 3-5 months by more than half (50%) of the mothers. Relatives and the traditional birth attendant (TBA) present at the time of birth were said to play a key role in initiation of BF and pre-lacteals use. They prepared the pre-lacteals and, in most cases, also the ones who [first] gave it to the baby. Surprisingly, the respondents also reported that health workers encouraged giving the newborns water as a means of keeping their temperature low during fever. Even those who gave birth in health centres reported having given pre-lacteals to their babies while still in the health centre.

“The health workers did not refuse people to bring hot water in thermos flasks. They did not refuse us to give the baby water”. Mother of a 3 month old baby in Orom, Kitgum district.

Immediate initiation to breast feeding (BF) is a cultural practice among the Acholi. According to DHS (2006), 85.5% and 86.6% of male and female babies respectively in Northern Uganda were initiated on breastfeeding within an hour of birth. Comparing the DHS with the observation from this study, they are in agreement. By 2006, 37.2% of the infants in Northern Uganda received pre-lacteals and in 2011, 38.4% received pre-lacteals (UBOS, 2006; UBOS, 2011). The study’s finding of increased pre-lacteals use agree with other studies in Uganda. A cross-sectional household survey in rural district of Hoima, Western Uganda showed high pre-lacteals use at 43% (Wamani *et al.*, 2005). For the case in point, pre-lacteals use was motivated by relatives who were caring for the new mother and the baby. They believed that pre-lacteals gave the babies strength, and quenched thirst.

Pre-lacteals like honey and local herbs were given to the infants to prevent development of false teeth before the recommended time for development of the milk teeth. Water based pre-lacteals which were commonly used in this area is associated with delayed milk arrival due to lack of breast milk production stimulation hence delay in breastfeeding initiation (Pășrez-Escasmilla, Sofia and Fawazi, 1996). This deprives the baby of colostrums. Pre-lacteals have no nutrients required by the infants except a few calories. A study conducted in eastern Uganda on caretaker-infant (0-11 months) pairs reported that infants who received pre-lacteals tended to have poor weight-for-age outcomes (Engebretsen *et al.*, 2003).

The finding of early introduction of solids/fluids by half of the mothers between 3-5 months is consistent with DHS (2006) which indicates that only 34.8% of infants 4-5 months were still exclusively breastfed. An earlier study by Olwedo *et al.* (2008) in IDPs camps in northern Uganda it was reported that nearly half, 49% of the children started complementary feeding at 6 months and 39 % received complementary foods before the age of 6 months. This varies with the point incase probably because of the different study times. The 2008 study was in a camp setting where getting food was a problem while this study had about 50% of the participants already resettled back in their homes. However, the current findings is still in agreement with a study in southern Uganda which showed that foods/fluids other than breast milk were also started in two thirds (60.7%) of the infants before they were 6 months old, while only 39.3% were started at 6 months (Turyashemererwa , Kikafunda and Agaba, 2009). Introduction of foods/fluids other than breast milk too early reduces the amount of breast milk and Vitamin A intake of the infant. It introduces the child to pathogens through unhygienic preparation and feeding of the food which lead to subsequent diarrheal diseases and other infections (PAHO/WHO, 2003).

4.2.1 Signals/indicators mothers use to introduce solids/semisolid food to the infants.

Solid foods were started when the baby started reaching for objects and put them in the mouth or baby was trying to say some words (e.g. around two months), and almost universal when the baby was able to sit with little support (about four months old). Mothers indicated that they gave food based on or as dictated by; a) the child's growth milestones, and rarely the child's age, like sitting, reaching out for food or other objects to put in the mouth, having teeth b) clues from the baby like crying, uneasiness, looking hungry/lethargic, looking sickly/having fever, changes in the colour/smell/consistency of the stools, and c) comments/advice from relatives, friends, and health workers.

“The baby is the best dictator of whether to give food or not. If the baby cries all the time and cannot allow you [or your husband] to do other work or sleep at night, you will have to give them something to eat, especially if they start refusing to breastfeed or they continue even after breastfeeding. Everyone will ask you to give the baby food, or say the baby is not having enough. You are then forced to feed them, Focus Group in Lagoro, Kitgum district.

Mothers-in-law and to some extent the husband's advice was adhered to because they were revered. Grandmothers and friends were trusted and always wished the mother and baby well. The health worker was seen as knowledgeable and looked at everything from the perspective of improving the health of the child. However, advices from grandmothers and friends/peers was seen as most likely to be implemented since these groups provided support and follow-up on their advices which were based on the realities at home contrary to that of health workers or the radio.

Evidenced by the different NGOs in the area implementing child Nutrition interventions, the mothers have knowledge on when to introduce complementary foods. It's likely that influence from their relatives and peers lead them to adopt growth and development indicators instead to introduce solids to the infants. These indicators may translate to other issues with the infant and vary from one infant to another.

4.2.2 Feeding of the infants during and after illnesses

It was observed that 42% of the infants had watery stools a week before or the same week of the first visit to the household and 50% of the remaining infants had suffered from at least one of the other sickness namely; cough, fever and malaria. Close to 50% of the respondents reported that most parents did not change the eating patterns of their infants when they fell sick. These mothers did not increase the amounts of liquids during sicknesses expect for breast milk. Rarely, or sometimes, special foods would be prepared for the child—or food prepared in a special way.

“When the child is sick we may buy juice (ready to drink like passion) for the infant. We are advised by the health provider to give juice when sick because it gives them strength. We may also give them a water-sugar solution to give strength and cool the baby. We may also try to add simsim or groundnut paste in their food or have it fried with little oil. That time we can even add little sugar in their porridge”. FGD in Ogole, Wol parish

About half of the mothers (50%) estimated that one in every five children was given less food and drinks than they are done during sickness. This was for fear that some foods would aggravate or be a cause of diseases like diarrhea and constipation. They believed that cows' milk causes vomiting when fed to an infant who had fever. It also increases diarrheal episodes; however, it is used as a treatment for chicken pox in infants.

Rarely were special foods prepared for the child to enable them eat more and to “give them strength”. Studies have shown that children who were normally given solid foods but not breastfed at the time of illness had reduced energy intake by about 30% during acute diarrhea and children of the same age who were breastfed only had reduced energy intake by about 7% (Linkages, 2006). The whole objective is to make the baby eat more and to “give them strength”. Recommendations from health workers is more likely to be practiced when the infant is sick but not for preventive purpose. For the point in case, it is probable that the belief that some foods accelerate sicknesses in infants is the likely cause for not changing the eating patterns for the infants.

4.3 Type of foods and nutrient density of foods fed to Infants aged 6-11 months

Food supplemented breast milk which 75% of mothers said started reducing in amounts by the 6th month. The infants had to start and get use to eating other foods other than breast milk which in most cases did not have special modifications from family foods.

“While we were in the camps it was possible to prepare food for the baby and sit to feed them. We got a special food [corn-soya blend] to prepare porridge for the children. Now, the infants have to eat what everyone else in the family is eating. Water is added into the family porridge to make it easy to swallow and fed to the infants when one is just introducing solids,” A mother from Wol, Pader District.

Table 4.2 shows the common foods eaten by infants in the community, the components used and the energy density computed from the 24-hour recall data of the 96 children.

Table 4.2: Types of complementary foods/recipes fed to infants 6-11 months in the area

Types of food	Common food components (in brackets are modifications)	% of children fed the food (24 hrs recall)	Mean energy density of the food, kcal/ml
Porridge	Millet or maize or sorghum flours, water (sugar)	24	0.9-1.0
Porridge with enrichment	Millet flour, water (sugar, groundnut or <i>simsim</i> paste)	46	1.2-1.5
Posho (stiff porridge)	Ordinary maize or cornmeal	24	3.4-3.6*
Bean/peas soup	Cooking oil, onions (silver fish, <i>simsim</i> /groundnuts)	15	0.6-1.3
Malakwang	<i>Simsim</i> /groundnuts, <i>alkali salt</i>	8	0.6-0.9
Cow pea leaf	Okra, <i>alkali salt</i> <i>Simsim</i> /groundnuts or cooking oil and onions	42	0.8-2.6

* expressed in kcal/g

The diets were mainly from plant based food sources unless it was modified with silver fish. Animal products like milk and eggs were normally not used in the diets cooked in the homes.

The porridges were made mainly from cereal flours, and rarely was sugar added to it: mothers feared to get the infants “*used to sweet things as they would refuse to eat when it would not be available*”. The finding is consistent with IMC (2008) which showed that foods fed to infants in Kitgum and Pader districts were plant based. Studies have shown that cereal based complementary foods do not meet the infants’ nutritional requirements given that they are fed singly with minimal modifications to complete the recommendations (Neumanna *et al.*, 2007; Bhutta, 2000). After 6 months, the infants require increased amounts of all the nutrients from a source other than breast milk. Feeding the infants on low density nutrients foods with low nutrients bioavailability compromise their nutritional status.

Although it was frequently indicated that the porridge could be enriched with groundnut or *simsim* paste, 60% of the mothers indicated it was not a common practice.

There are traditional ways of making food “richer and better”, like drying of vegetables, and incorporation of smoked meats in it but these as well are not commonly practiced now. The traditional ways of preserving and storing fruits and vegetables are getting extinct. Many homes cook with the alkali salt locally known as *kado atwona* made from water drained/leached through ashes from *simsim* stalks, reeds, pigeon peas stalks, and other plants— it acts just like magadi salt or sodium bicarbonate. It softens vegetables, making them cook faster, used to neutralize the sour taste of some vegetables and also as a food preservative. Physical modifications of the foods, e.g. mashing or breaking into smaller pieces, were done using fingers in the mother’s or caregiver’s plate. Infants were also fed using fingers, unless the porridge was very watery, as for the younger infants. Food components were got from home gardens or gathered or collected from family/friend’s farms; foods were purchased only when the supply from own gardens was finished.

4.3.1 Feeding frequency of infants 0-12 months

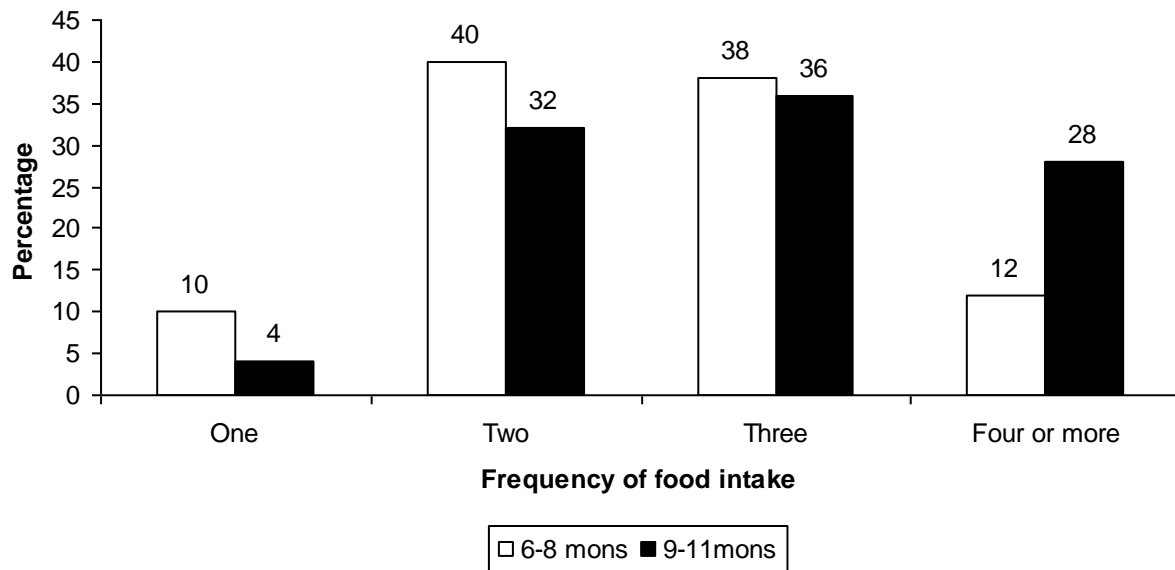


Figure 4.2: Frequency of feeding complementary foods in a day

The mean frequency of feeding children was 3.9 ± 1.6 for age groups 6-8 and 4.2 ± 1.4 for children aged 9-11 months. There was a significant difference ($p < 0.05$) between the mean eating frequencies of the two age groups. About 50% of children of 6-8 months and 64% of children of 9-11 months were fed 3-4 times. Regarding breastfeeding, 90% of the mothers reported that they breastfed on demand. This rendered it difficult to establish the exact number of times a mother breastfed her infant. However, more than half of the infants were breastfed about 10 or more times in a day.

Breastfeeding was on demand which was not much surprising since most mothers keep with their younger infants strapped on their backs most times therefore, they are able to breastfeed them whenever they demanded.

The observation is in line with the DHS, 2006 which shows that 95.9% of the infants were breastfed more than 6 times in a day. However, very frequent breastfeeding could be a negative practice for infants above 6 months as they would rely on breast milk alone even if it did not meet their nutritional demand anymore. Complementary feeding frequency had a mean of 3.9 ± 1.6 and 4.2 ± 1.4 for age groups 6-8 and 9-11 respectively months which is not in agreement with the DHS, 2006 which had an average of two times a day. This is possible since this study was conducted between September 2009 and March 2010. The harvest period in the area when most foods are available within the households therefore it is possible for mothers to feed their infants slightly more frequently. Besides during the 2006 DHS, some people in this area were still in IDP camps which meant poor access to food. The relatively high frequency of feeding the infants would imply that the major issue in the area would be quality of the foods fed.

4.3.2 Dietary contributions from complementary foods

Table 4.3 shows the quantity of food fed to the infant in a day. The average frequency of intake of porridge was 1.5 times a day.

Table 4.3: Daily food intake and dietary contribution of complementary foods fed to infants 6-11 months old.

Common food	Ranges of amount Consumed	Energy (kcal)	Estimated amounts to meet the RDI for kcal	Protein (g)	Vitamin A (µg)	Zinc (mg)	Iron (mg)
Millet porridge	58-240 ml	153.4 (17)	2533ml	2.7 (19)	1.9 (0.58)	0.5 (16)	1.1 (15.7)
(enriched)							
Cow pea leaf sauce	29-169 ml	56.4 (6.4)	633ml	4.0 (28)	200.0 (61.5)	1.0 (33)	0.3 (4.28)
Beans sauce	42-152ml	123.0 (14)	1358ml	1.99 (14)	202.0 (62)	0.38 (12.6)	0.36 (5.1)
<i>Malakwang</i> sauce	24-146ml	54.5 (6.2)	527ml	2.6 (18)	463.1 (142)	0.05 (1.66)	0.1 (1.4)
Sorghum bread	25-115 g	238.2 (27)	1890g	7.9 (56)	4.9 (1.5)	2.9 (0.96)	1.1 (15.7)

In brackets are % of RDI supplied by consumed amounts (for age group 6-12 months).

Mothers reported that they often fed their infants until they showed clues of having had enough like; refusing to open their mouth or turning away, and spitting out the food during feeding. Sometimes the infants push away the food or start playing with it.

“The infants don’t eat much as they get tired of the same type of food we give them again and again. And also because sometimes mothers are tired and have little time to prepare “good” foods or prepare foods well. In some cases the infants reach an age when they just do not want to eat especially boys who want to breastfeed only. When they breastfeed too much they do not want other foods either”, FGD in Lagoro, Kitgum District.

The quantity of food consumed by the infants depended on what the caregivers thought or experienced as enough.

Often times this is preceded by clues from infants like; closing their mouth to food, pushing the food aside and others. These clues, however, maybe misleading a times especially when the infant does not like the food or when something was wrong with them. Foods that were consumed by the infants and contributed significantly to the energy amounts were gruels (made mainly from millet, sorghum and maize meal). Cowpea leaf sauce had more contribution to protein and Vitamin A intake. The other portion of proteins came from the components which were used in preparing the food like *simsim*/groundnuts paste as elaborated in tables 4.3 and 4. 4. Simsim and ground nuts are good sources of proteins therefore they enrich the foods pasted with them with proteins.

The average meal frequency of 4 times/day observed from the study had contributions on the quantity of macronutrients taken in by the infants considering the nature of the complementary foods fed. Millet and sorghum and legumes tend to have higher energy and protein content compared to micronutrients (Léder, 2004). The iron in millet and sorghum are rendered non bio-available by the presence of phytates and phenolic compounds in the food components (Hotz and McClafferty, 2007). There was an ongoing nutrition program in the study area which provided vegetable oil and corn meal to households with malnourished children, lactating mothers and pregnant women. This meant most of their foods are cooked with vegetable oil which increased the energy density of the foods fed to the infants. They, however, did not meet their macronutrient requirements even with factors like; effects of food processing, storage and cooking on the foods taken into consideration. Consumption of majorly plant based sources of nutrients was the likely reason for not meeting the micronutrient needs. Plant based foods especially vegetables as nutrient sources are relatively low in micronutrients which are also less bio-available compared to animal sources (Murphy and Allen, 2003).

Leafy plants are high in oxalate which form insoluble compounds that reduce the amount of minerals absorbed through the intestine (Neumann, Mrphy, Gewa, Grillenberger and Bwibo, 2002).

4.4 Energy and nutrients intake by infants aged 6-11 months

Table 4.4 shows the energy and nutrient intakes of the infants compared with recommended needs to be met by complementary foods.

Table 4.4: Daily total nutrients intake of infants 6-11 months old fed on complementary foods

	6-8 months (n = 45)			9-11 months (n = 51)		
	Estimated needs from CF (WHO, 2002)	Intake ranges	% meeting needs	Estimated needs from CF (WHO, 2002)	Mean intake \pm SD	% meeting needs
Energy, kcal/day	202 ^a	208-758	77	307 ^a	275-965	81
Protein, g/day	9.1	5-23	65	9.6	6-30	79
Vitamin A, μgRE/day	400	10-310	7	400	3-503	21
Zinc, mg/day	4.0	0.4-5.35	23	4.1	1.2-6.8	43
Iron/mg/day	9.0	1.4-7	2	9.3	1.7-7-7	13

a figure is based on longitudinal studies of US children

In total 79% of the infants 6-11 months old in the study were offered foods which were enough to meet their energy and proteins needs while micronutrients intake were very low evidenced by the low percentages in the table. Although the mean energy and protein intake of the infants in this study were at the required level (depending on how intake is expressed), mean intakes of several micronutrients were far below recommended amounts, particularly iron, zinc and vitamin A.

Micronutrients levels of the complementary foods were relatively low, and also the micronutrient quality of the diet was poor. The results were similar to those from a study conducted in 2008 in Lusaka, Zambia, Owino *et al.* (2008) which showed that most of the infants met their energy and protein intakes but not Iron needs from their diets. Low micronutrient density of complementary foods is not unique to Uganda given the types of foods fed and preparation methods according to the 24 hr recall data. The foods given to the infants are primarily made from diluted family foods in addition to breast milk.

Studies show that Ugandan, Zambian and Ghanaian infants are fed on mainly watery cereal porridges of low energy and nutrient densities which are often prepared, served and stored under conditions that expose the child to frequent infections (Lartey, 2008). Total energy intake positively correlated with meal frequency ($p = 0.433$ at 99%) and quantity of food consumed per meal but not with energy density of complementary foods which is in agreement with (Kimmons, Dewey, Haque, Chakraborty, Osendarp and Brown, 2005)

Low micronutrients intake by the infants lead to poor development of their organs, there is susceptibility to anemia due to low iron content of blood and poor immune response for inadequate Vitamin A. intake. According to Fischer, Aboubakar, Van de Weerd and Black (2007), Zinc can decrease the duration of diarrheal episodes by 15% and significantly reduce the risk of treatment failure or death by 42%. Infants need a good dietary source of iron and Zinc by about 6 months which cannot be met by breast milk alone due to depletion from maternal stores (milk).

On the other hand consumption of green leafy vegetables, a good source of Vitamin A should have completed the Vitamin A requirements for the infants but was the contrary. Possibly, relatively small quantities of green vegetables were fed to the infants and the specific types of vegetables were low in Vitamin A, Iron and Zinc content. All in all, dietary intake figures could have also been affected by the conversion factors used since Tanzanian food composition tables were used in this study, as the Ugandan data were not yet in place. There is also a possibility that modifications could have been made in foods types and amounts fed to the infants during data collection because of the nature of the 24 hr recall procedure which requires prior training to the caregivers on what will be done during data collection.

4.4.1 Relationship within the variables which affect IYCF practices

As shown in Table 4.5 below, older infants received more meals (frequency) per day than younger infants ($p = 0.03$). The older infants (9-11 months) were more likely to meet at least two of the three IYCF standards ($p = 0.037$) that is; receiving solids or semisolid foods at least 3 times a day and feeding on foods from at least 3 food groups in a day for breastfed infants. Total protein and zinc consumed in the diets served on the day of study were positively associated with infants' appetite ($p = 0.14$ and 0.019 respectively). The total intake of zinc and iron were higher in older infants. However, this was not significant for the level of vitamin A intake. Total kcal had a stronger association with infants' age ($p = 0.01$ at 99%) while intakes of protein was at ($p = 0.031$), Zinc at ($p = 0.05$) and iron was at ($p = 0.031$) respectively. Protein was at ($p = 0.031$), Zinc at ($p = 0.05$) and iron was at ($p = 0.031$).

Table 4.5: Correlation matrix showing the relations among the variables in the study

	Age	# of meals /day	Diversity score	IYCF 2	Appetite	% met need Energy	% met need protein	% met need vit A	% met Iron needs	% met Zinc needs
Age	1									
# of meals /day	0.222*	1								
Food diversity score	0.828	0.444**	1							
IYCF 2	0.213*	0.757**	0.412*	1						
Appetite	-0.191	0.156	0.118	0.152	1					
% met need Energy	0.054	0.433**	0.322**	0.424**	0.163	1				
% met need protein	0.158	0.425**	0.336**	0.369**	0.242*	0.726**	1			
% met need vit A	0.194	0.249*	-0.015	0.214*	0.070	0.212*	0.185	1		
% met need Zinc	0.196	0.242*	0.159	0.167	0.000	0.155	0.184	0.196	1	
% met need Iron	0.211*	0.346*	0.170	0.317**	0.183	0.371**	0.444**	0.384**	0.417**	1

* Correlation is significant at the $p < 0.05$ level (2-tailed).

** Correlation is significant at the $p < 0.01$ level (2-tailed)

The fact that older infants had more meal frequency than the younger infants is justifiable by reasons that breast milk is still considered as the main food for infants 6-9 months old and so they are fed solids/fluids less frequent. Besides that younger infants are always with their mothers therefore have constant access to breast milk than other solids/fluids. The higher frequency of feeding also contributes to more of the older infants meeting their energy needs and meeting at least 2 of the 3 IYCF practices. The more amount of food eaten by the infants the more likely they were to meet their protein and Zinc needs. Increasing the quantities of the food served to infants with active feeding for the infants in this area would improve their protein and Zinc intake.

4.5 Challenges in complementary feeding

Four challenges were mainly identified as constraining complementary feeding and are presented below; 1) the time of the women and high workload, 2) poor access to foods that would be appropriate as complementary foods, 3) lack of knowledge and skills to use available foods to meet the needs of the baby, and 4) many children to attend to/irresponsibility of the husbands.

4.5.1 Maternal time and work load

Figure 4.3 illustrates a typical day activities performed by most of the mothers in the area. Mothers reported being busy doing some work either within or away from home most of the time. This often rendered them unable to feed their children on time and for recommended number of times in a day.

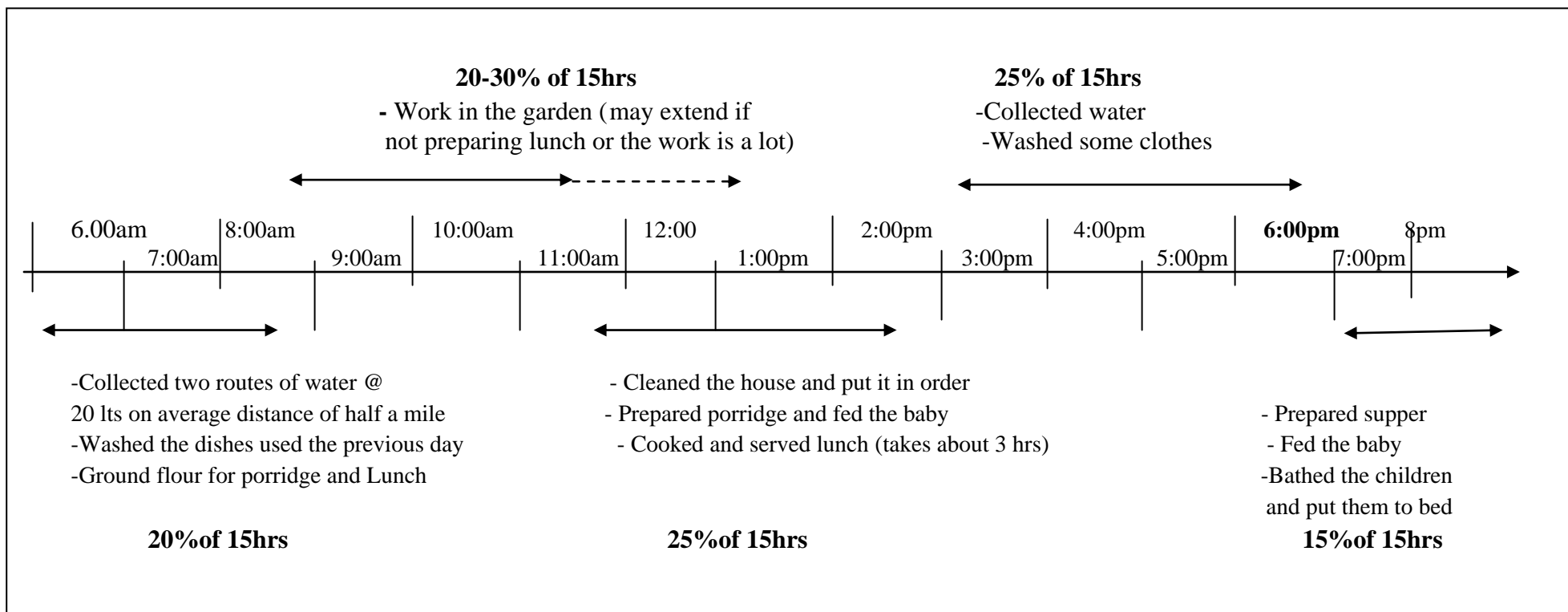


Figure 4.3: Activity schedules for 5 women with infants aged 6-11 months from 6am to 8pm (15 hrs) in Palwo parish, Omia Anyima, Kitgum District.

On average the total energy expended per day on collecting water alone is 552 Joules (taking the average weight of the woman at 60kg).

Considering total energy expenditure per day for a woman, there is a high negative impact on breast milk secretion for the infants

On average 2 hours were spent fetching water and an average of 5 hours preparing and cooking the day's meals. The rest of the time was spent in the farm and doing other chores compared to an average of 3 out of 15 hours a day on childcare. The women think that even with the availability of most requirements, time still remains a limiting factor because they have so much to do. This information is compounded by Table 4.6 which shows that the demand for labour is almost throughout the year with the months of June, October and February as the only free time in the area. VHTs and community leaders confirmed that women are often times left to do all the work alone by their husbands.

“Women are toiling alone in the gardens while the men have taken to alcohol. All their time is spent drinking and socializing and they do not care about their families. They do not even know whether farming is going on, whether there is food or sickness in the home. It is the women who have to shoulder all the difficulties” a VHT in Lagoro, Kitgum District.

High maternal work load compromises appropriate complementary feeding practices. The mothers spent 80% of their time on farm work and other domestic chores compared to child care. These findings are in agreement with UNDP (2008) which highlight the critical role of rural women in the rural economies of both developed and developing countries. Taking an average of 1.5 hours on child care a day, women have 10.5 extra hours of work a week especially on child care compared to men. This is in comparison with studies in developing countries in Africa and Asia where women typically worked 12-13 hours per week than men in addition to vital reproductive functions like caring for children, older persons and the sick (Nwanze, 2010). In Uganda, women spend seven hours per day in their fields with an additional 1.5 hours tending and grazing small animals such as goats and pigs (Barret and Browne, 1993).

As illustrated in Figure 4.3, there was even more workload for the mothers in the study area since they were resettling back on their original homes therefore home rebuilding was still going on. Workload and time is an issue which cuts across many sectors, and many a times this has compromised the health and nutrition status of people in the woman's care especially infants.

The challenges are consistent with the Lusaka study which showed that although mothers had wide knowledge of optimal infant feeding, actual practices were constrained by among others maternal time availability (Owino *et al.*, 2008). High maternal workload for this case could be compounded with loss of grandmother culture in the area. Grandmothers would previously take care of their grandchildren while the mothers worked and in the event the infants were fed very well. This practice ceased with settlement in the IDP camps.

4.5.2 Food availability and seasonality

As shown in Table 4.6 most food stuffs are available from November to April. Fruits, mainly mangoes can only be accessed in the area during the in-season which is April to May. Vegetables are available throughout the year; during the wet season it is consumed fresh while in dry season it is in processed (dried) form. This normally bridged the gap during food shortages.

Table 4.6: Diseases, labour demand and crop calendar for Kitgum and Pader districts

SEASONS	Rainy season				Dry	Rainy season				Dry		
INCIDENCES			Malaria peak									
OF		ARI peak due to high rains	Cough and Diarrhoea		Diarrhoeal disease peak(during groundnuts harvests)	Cough						
DISEASES												
MONTHS	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
HH/FARM	High labour needs in the field for land preparation, crop planting and weeding				Labour needs for crop harvesting and planting for the second rains				Harvesting grass for house repairs			
LABOUR									Collecting and storing firewood			
TRENDS									Harvesting and processing cereals and vegetables			
FOODS	Cowpea leaves, okra	Fresh vegetables of various types, Mangoes, simsim, millet, sorghum			Maize on cob, groundnuts, Vegetables, sweet potatoes				Beans, Peas, dried vegetables, sweet potatoes, millet, sorghum			
AVAILABLE				Hunger peak								

The table was derived from the discussions had with mothers in the interview process

There is normally an intense hunger peak between June and July when most crops are still in the garden. During this period, sauce (mainly fresh vegetables) is available but what to eat with it like millet, sorghum and tubers are not harvested yet hence unavailable. The area was hit by drought in the last season resulting in poor harvests which affected food availability within the households. The mothers reported being more affected compared to other people because the child had to breastfeed regardless of whether she had eaten enough food or not.

“There has been a lot of sunshine. The beans I planted did not do well. I struggle to get food to eat so that Gloria gets some breast milk because if I don’t eat, Gloria cannot have much to feed on since her major source of food at the moment is breast milk and some soup of the sauces I make” Helen, a mother of 6 from Lagoro, Kitgum district.

Mothers also reported that they had challenges in diversifying the daily feeds of the infants as there were limited food varieties in the area. Some of the foods they believed to be appropriate for their infants were not found in their communities e.g. milk and fruits (Pawpaw, bananas). They do not grow well in the area due to its location in the dry zone. They rely on supplies from other communities and to these come with increased costs and compromised quality due to transportation.

Due to less variety of foods, infants tend to have less micronutrient from the few foods fed to them and this could also affect quantities consumed. This is consistent with a study by Saha *et al.* (2008) which reported that greater household food security was associated with better infant feeding practices during 6–12 months but poorer infant feeding practices during 3–6 months.

4.6 Other constraints faced during complementary feeding

Results showed that about 30% of mothers do not know what foods to give their infants at a given age and time. These mothers also reported that they are not getting support from some community members who exert pressure on them to introduce foods other than breast milk earlier than recommended instead of providing them with encouragement.

Mothers reported that they lacked facilities for preparing components for the baby foods; there were no grinding machines in place so they used grinding stones to make flour for the porridges. The resulting flour was rough and that required sieving before use to improve its texture. Traditionally grinding stones were used but camp life has changed this trend so that mothers think that it is time wasting to use it.

Fuel for cooking has also become a serious problem for the community. All the nearby sources of firewood were depleted while people were in the camps hence the women have to walk longer distances in search for it. They further reported that it was not unusual that they failed to prepare food for the children due to lack of firewood.

4.7 Coping strategies used by households in improving complementary feeding of 6-11 month olds

Results showed that, over 50% of the families normally sell portions of household foods in order to raise some income. In many events they have had to engage in casual labour like fetching water at building sites and working in other people's fields to raise some money. The money made was used for acquiring additional foods which are scarce or do not grow well or are not grown in the area like beans as well as other items needed in the homes.

In that way the households were in position to diversify the infants' diets. From their crop harvests, the women ensured that they processed and stocked up food for the bad days or off seasons. This was mainly done for vegetables like cow pea leaves, *malakwang* which have to be blanched first then dried and stored. Fruits like *boke okwee* and roots and tubers like sweet potatoes and cassava were also processed. They also ensured that during in-season they purchase enough of the produce which is hard to get in their areas.

In Lagoro sub-county, Kitgum District, the common livelihood activities for women besides farming were; pottery, charcoal-burning and alcohol brewing. One had to indulge in more than one activity in order to meet the family demand for an income. The women also organized themselves into groups and were running saving schemes 'cash box' into which members saved their money and dividends were got at an agreed time. The money could be accessed as loans for urgent needs.

Due to heavy maternal workload the infants' eating time and frequency are compromised. The mothers tend to try to do a substantial amount of work before settling down to cook and feed the infants. When the situation is so extreme the mothers will reduce the cooking times to once a day hence reducing feeding frequency. This is a common occurrence especially for the days when there is food scarcity.

4.8 Opportunities of improving complementary feeding in the study area

From the study, observation that 75% of the infants were in position to meet their energy needs implies that it is possible for the infants to also meet their micronutrient needs. With the foods that are providing the infants with energy, modifications can be made to improve the

micronutrients contents of these foods thereby improving their intake of the essential micronutrients.

Most people have returned and are settling in their own homes where they have access to land for farming. The community members are embarking on farming to ensure that there is enough food for their families. The men believe that given time and favourable weather conditions they will be able to provide enough food for their families. They also acknowledged that it is easier for them to get food for their families now because of the many avenues like; hunting and gathering which can be used unlike while in the camps. With the return home, the communities' members have also started planting fruit trees like oranges, pawpaw. This will provide the infants with some micronutrients which they are not having enough currently. The communities in Kitgum and Pader districts once kept cattle before the insecurities cropped in. Slowly they are reviving the practice to a small scale which will eventually ensure that households can have products like milk to feed to the infants hence improving their nutrition.

The relief food which was provided by humanitarian organization was lacking in variety but with the current ability to grow crops and acquire food from other means they can now afford to have various foods and in better quantities. It is also likely that purchases of local foods will go down so that manufactured foods like sugar can be afforded. Besides the culture of food sharing previously practiced in the area has started once more whereby families are able to exchange food stuffs amongst them. Through this, families are able acquire what they do not have in their households.

With sensitization received from several non-governmental organizations working in these areas, the levels of domestic violence have relatively reduced. Some men now appreciate the much work women have to do and so they are now able to help their spouses with both garden and some domestic work though still at a very small extent. Through the same means, people have got ideas on what is good for the infants in terms of feeding including the fathers. About 10% of the men reported that they now have time to sit and discuss with their spouses on infant feeding issues. In most settings men are in control of family resources and lead decision makings in the homes, their knowledge and participation in infant and child care presents a big opportunity to improve nutrition of children in a given community.

4.9 Adoption of recommended IYCF practices

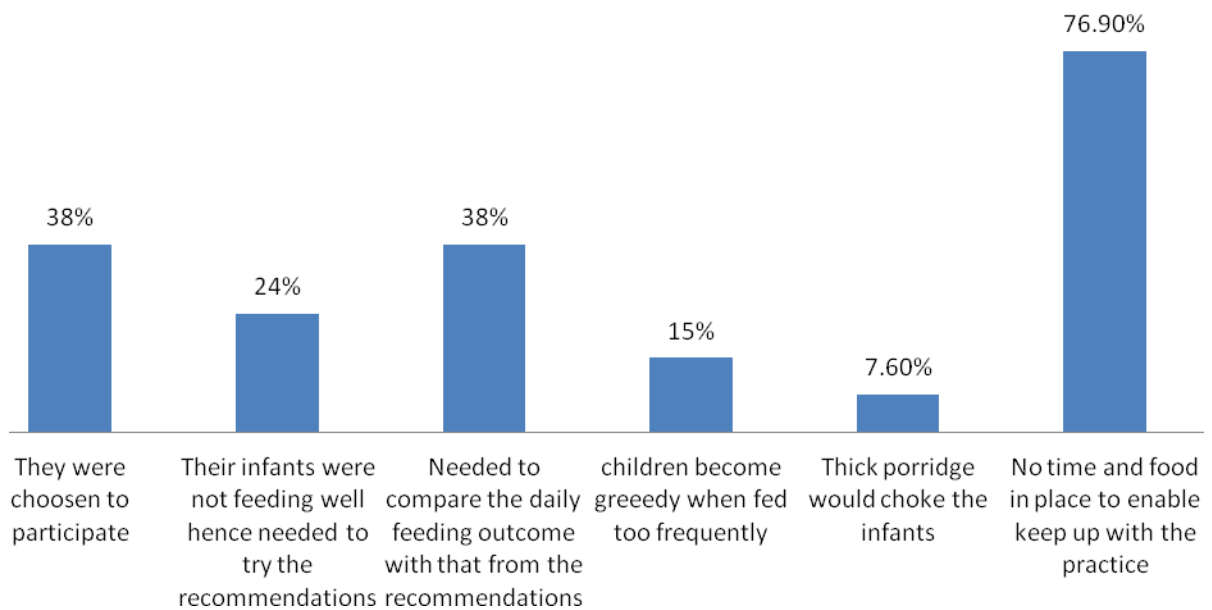


Figure 4.4: Reasons for participating in TIPs and attitudes towards recommended IYCF practices

It was observed that younger mothers were more likely to take up the recommendations than older ones. The participating mothers received several comments from the other family members and neighbours regarding the different practices being tried out. In all, only 23.1% of the mothers were in position to adopt the recommendations. Table 8 below shows the outcomes of the Trials for improved practices (TIPs) for feeding the infants which were tried out by the mothers. In Table 4.7, n is the number of mothers who participated.

Table 4.7: TIPs table showing the Trial messages, observations and challenges with the practices tried out

	Eating frequency n = 8	Density of prepared food n = 9	Hygiene n = 4
Trail message	<p>Feed the baby at least 3 times a day while breastfeeding in between for atleast 8 times in a day</p> <p>This enables the infants to take in food amounts enough to meet their RDA</p>	<p>Porridges and soups should be made less viscous and other ingredients like; sugar, paste (<i>simsim</i>/groundnuts) added to it.</p> <p>These increase the energy density of the food hence taking care of the small amounts consumed by the infants</p>	<p>Food to be prepared in a clean place using clean utensils and infants fed warm food in clean environment</p> <p>This is to avoid infections like diarrhea which would affect nutrients intake by the infants</p>
Observations	<p>-Mothers reported that they felt the Infants suckled with less force and for a shorter time compared to before.</p> <p>-The infants played away from the mother longer and cried less</p>	<p>-The infants ate more food and for 2 of them, this marked the beginning of self- feeding giving mothers free time</p> <p>-The infants played away from their mothers longer so breast-feeding episodes were reduced.</p>	<p>- No serious diarrheal cases since visit 2 were reported.</p> <p>- It felt good to be in a clean environment</p>
Challenges	<p>- There was not enough time to prepare food more than twice a day then sit and feed the infant.</p> <p>-Foods are very scarce therefore it is hard to get what to feed the infants on as recommended</p>	<p>Lack of ingredients to be used to prepare infant foods.</p> <p>-It takes longer to prepare the porridges as asked</p>	<p>- Mothers reported that they are not always at home hence hard to ensure hygiene is maintained more so when infant is playing away from her.</p>
Modified Messages	<p>- Feed the infants atleast 3 times a day and breastfeed atleast 8 times in between ensuring that there is balance between the two, for infants less than 8 months start with breastfeeding followed by other foods and vice versa for older children</p>	<p>-Foods that are thick enough to stay on the spoon give more energy to the child.</p> <p>-A little oil or fat should be added to the meals daily to increase its energy content</p>	<p>- Ensure that all the foods are covered in a clean place and clean hands before feeding the infant</p> <p>-All wastes should be disposed off in proper places.</p>

According to the mothers all the tried practices had positive outcomes because it led to reduced time with the infants. However, even with the positive outcomes the mothers emphasized that they could not easily take up the recommendations due to lack of time and appropriate CFs for the infants. Maternal time has been a recurring barrier in this study especially in regards to child care. Negative pressures from relatives, neighbours and peers on how the mothers feed their infants were also big determinants on whether or not the mothers would adopt the practices. Few mothers were willing to adopt the recommendations probably because of their perception that it should be important to be asked to try out the practices and this would lead to better health for their infants. They were even more positive to spread the messages to the villagers despite the many non-supportive comments received from other community members. This observation is consistent with a TIPS study conducted in Lao Peoples' Democratic Republic on consulting with caregivers on infant feeding practices (Gillespie *et al.*, 2004). It is important though to remember that since TIPS is a closely monitored process, the mothers may actually find it so difficult to take up what they initially thought was possible after the monitor finally leaves.

Observations from the TIPS also shows how the way IYCF messages are passed may affect the outcomes of the practices especially when clarifications are not made about them. Messages encouraging increased meal frequency without specifications on how mothers can maintain optimal milk supply leads to reduced breastfeeding demands which could possibly lead to reduction of the mothers' initiative to breastfeed the infants. For this case mothers reported that the infants played away from them for a longer time than before. Because infants are good at self regulating their energy intake, they will reduce breast milk intake when given a large amount of energy from other foods. This is detrimental to the infant's health considering breast milk benefits and the fact that the quality of complementary foods is not that good especially in

developing countries (Linkages, 2006). In contrast, breast milk consumption decreases slightly for increased feeding frequency of the complementary feeding regimen. This is because of a shorter time spent nursing, which probably occurs in response to the infants' greater meal-related satiety (Islam *et al.*, 2008). Increase in complementary food intake due to reduced breastfeeding frequency would result in a 17% increase in protein intake, but only small increases in the intakes of iron, zinc, calcium, and riboflavin, and a small decrease in the intakes of vitamins A (Kimmons *et al.*, 2005).

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The results from this work imply that the age group 6-12 months remains a critical one in terms of malnutrition in the study area. This is because of sub-optimal feeding practices whereby half of the infants are introduced to food/fluids other than breast milk as early as 3-5 months of age. Most (75%) of infants aged 6-12 months are not meeting their micronutrients needs because their main foods are plant based with low levels of micronutrients and poor absorption levels. There exists opportunities to improve IYCF practices in the area by the fact that the communities are resettling back into their own homes from the IDP camps and that most mothers in the area have some knowledge on IYCF. However, there is need to change their attitudes to positive IYCF practices by having time saving and workload reduction interventions.

5.2 Recommendations

In reference to the above findings, there is need to reinforce knowledge and BCC on IYCF to health workers and mothers. The mothers should then be encouraged to create time to practice them out. Investing in Knowledge and the practice of optimal complementary feeding practices would maximize the chances of proper growth and cognitive development hence improved adulthood outcomes. Such a capital investment would promote social and economic development of a community and a nation.

Only correct, consistent and coordinated messages on IYCF should be passed to the mothers starting from the health workers to other community based workers. This will avoid the misinterpretation of the same messages by the different stakeholders involved in the cause

Specially designed interventions which go further to enable and ensure the use of the knowledge the mothers possess should be put in place. This can be done using the information from the study. It should directly include men so that they are aware of their roles and responsibilities in childcare in their homes. Several NGOs in these areas have programs which are not only providing supplemental foods but also Health and Nutrition education. These programs would be greatly enhanced with addition of means of enabling the passed information to be practiced. Mothers should be introduced to projects which provide animal source foods for their children e.g. poultry rearing, domestic animals rearing and fish rearing. This will improve the micronutrients intake of the children. Appropriate income generating activities should be introduced to the mothers in order to enable them be in position to supplement their children's diets and improve their livelihoods.

Further research should be carried out to assess young children's nutritional status to determine whether the mothers' self-reported improvement in feeding behaviors during TIPS correlate with improvement in complementary feeding practices and hence children's nutritional status. The study should also tease out the determinants for adoption of recommended IYCF practices.

References

- Africa News. The guardian.com, Tuesday 16 August 2011 11.24 BST.
- Agostoni, C., Decsi. T., Fewtrell, M., Goale, O., Kolacek, S., Koletzko, B., Michaelsen, F. K., Aworh, A. O., (2008). The Role of Traditional Food Processing Technologies in National Development: the West African Experience. In: Robertson, G. L, & Lupien, J. R. (ed.). *Using Food Science and Technology to Improve Nutrition and Promote National Development*. International Union of Food Science & Technology.
- Al-Awadi, F.A and Amine E. K., (1997). Recent trends in infant feeding patterns and weaning practices in Kuwait. *Eastern Mediterranean Health Journal* 1997; 3(3), 501-510. and Agriculture Organization of the United States. Accessed 12/04/11 at <ftp://ftp.fao.org/ag/agn/nutrition/ncp/uga.pdf>.
- Anigo, K. M., Ameh, D.A., Ibrahim, S and Danbauchi, S. S. (2010). Nutrient composition of complementary food posho formulated from malted cereals, soybeans and groundnut for use in North-western Nigeria. *African Journal of Food Science* 4(3), 65-72.
- Arimond, M and Ruel M.T., (2004). Dietary diversity is associated with child nutritional status: evidence from 11 demographic and health surveys. *Journal of Nutrition*, 134(10), 2579-85.
- Ashworth, A., (2002). Feeding Young Children. Footsteps No. 52, September 2002.
- Barrett, R. B, and Browne, A., (1993). Workloads of rural African women: The impact of economic adjustment in sub-Saharan Africa. *Journal of Occupational Science* 1(2), 3-11.
- Batal, M., Boulghourjian. C, and Akik, C. (2010). Complementary feeding patterns in a developing country: a cross-sectional study across Lebanon. *Eastern Mediterranean Health Journal* 16 (2), 180-186.

- Bhutta, A. Z. (2000). Iron and Zinc from Complementary Foods: Some Issues from *Pakistan. Pediatrics* 106 (5), 1295-1297.
- Black, M. M., Siegel, H. E., Abel, Y, and Bentley, E. M., (2001). Home and Videotape Intervention Delays Early Complementary Feeding Among Adolescent Mothers. *Journal of Pediatrics* 107 (5) e67.
- Black, R. E., Allen, H. L., Bhutta, A. Z., Caulfield, E. L., Onis, M., Ezzati, M., Mathers, C, and Rivera, J., (2008). Maternal and child undernutrition: Global and regional exposure and health consequences. *The Lancet* .www.thelanct.com (16 January 2008).
- Butte, F. N. (2000). Fat intake of children in relation to energy requirements. *American Journal of Clinical Nutrition* 72 (5), 1246S-1252S.
- Byaruhanga, B. Y and Opedum, M. P., (2008). The impact of culture on food security in Uganda. Academic essay on how a paternal society and traditions impact on food security in Uganda. *Global Knowledge* No. 1 2008.
- Church, M., (1979). The Health Education Council. Dietary factors in malnutrition: quality and quantity of diet in relation to child development. *Proceedings of the Nutrition Society* 38, 41.
- CRS, (2007). Nutrition knowledge attitude and practices survey in northern and western region (CRS program districts). Baltimore, MD: CRS.
- Dewey, K. G and Adu-Afarwuah, S., (2008). Systematic review of the efficacy and effectiveness of complementary feeding interventions in developing countries. *Maternal and Child Nutrition* 4, 24–85.
- Dewey, K. G and Brown, K. H., (2003). Update on technical issues concerning complementary feeding of young children in developing countries and implications for interventions programs. *Journal of Food and Nutrition*. 24, 5-28.

- Dickin, K, and Griffiths, M and Piwoz, E., (1997). Designing by Dialogue. A Program Planners' Guide to Consultative Research for Improving Young Child Feeding.
- Dórea, G. J., (2002). Zinc Deficiency in Nursing Infants. *Journal of the American College of Nutrition* 21(2) 84-87.
- Engelbrechtsen, S. M. I., Tylleskär T., Wamani, H., Karamagi, C., Tumwine, K . J., and Semiyaga, N., (2007). Low adherence to exclusive breastfeeding in Eastern Uganda: A community-based cross-sectional study comparing dietary recall since birth with 24-hour recall. *Biomedcentral Pediatrics*, 7:10 doi: 10.1186/1471-2431-7-10.
- Eriksson, G. J. (2005). The fetal origins hypothesis—10 years on. *British Medical Journal* 330:1096.
- FAO, (2010). Uganda Nutrition Profile 2010. Nutrition and Customer Protection Division. Food
- Fawzia, A, and Ezzat, K. A. (1997). Recent trends in infant feeding patterns and weaning practices in Kuwait. *Eastern Mediterranean Health Journal*. 3(3) 501-510.
- Fewtrell, S. M., Morgan, B. S., Duggan, C., Gunnlaugsson. G., Hibberd, L. P., Lucas, A and Kleinman, E. R., (2007). Optimal duration of exclusive breastfeeding: What is the evidence to support current Recommendations. *American Journal of Clinical Nutrition* 85, 635S-8S.
- Fischer, W. C. L., Aboubakar, S., Van deWeerd, R and Black, R., (2007). Zinc for diarrhea management in sub-Saharan Africa: A review. *East African Medical Journal* 84 (9), 441-449.
- Gillespie, A., Creed-Kanashiro, H., Sirivongsa, D., Sayakoummane, D and Galloway, R., (2004). Consulting With Caregivers: Using Formative Research to Improve Maternal and Newborn Care and Infant and Young Child Feeding in the Lao People's Democratic Republic. Health, Nutrition and Population (HNP) Discussion Paper. The International

Bank for Reconstruction and Development / The World Bank 1818 H Street, NW.
Washington, DC 20433.

Giugliani, R. J. E, and Victora, G . C. (2000). Complementary feeding. *Journal of Pediatrics* 76(3), 253-256.

Günther, L. B. A., Buyken .E. A and Kroke, A. (2007). Protein intake during the period of complementary feeding and early childhood and the association with body mass index and percentage body fat at 7 years of age. *American Journal of Clinical Nutrition* 85(6), 1626-1633.

Gupta, N., Gehri, M and Stettler, N., (2007). Early introduction of water and complementary feeding and nutritional status of children in northern Senegal. *Journal of Public Health Nutrition: 10*(11), 1299–1304.

Haider, R, Islam .A, Kabir .I and Habte. D., (1996). Early complementary feeding is associated with low nutritional status of young infants recovering from diarrhea, *Journal of Tropical Pediatrics* 42,170-172.

Hotz, C and McClafferty, B., (2007). From harvest to health: Challenges for developing biofortified staple foods and determining their impact on micronutrient status. *Food and Nutrition Bulletin* 28(2), 271-279.

Hung, M.M., (1998). Energy and Protein Values of Traditional Staple Foods Used in Child Feeding in Uganda and Feeding Recommendation. LINKAGES Project, 1998.

Hussein, A. K., (2005). Breastfeeding and complementary feeding practices in Tanzania. *East African Journal of Public Health* 2 (1), 27-31

Infant feeding Action Coalition (INFACT), (2005). Newsletter, Spring/summer 2005.
<http://www.infactcanada.ca/newsletter>.

- International Medical Corps, (2008). Healthy practices, strong communities program baseline assessment report, 2008.
- Islam, M. M., Khatun, M, Peerson, M. J, Ahmed, T., Abid, M. H., Mollah, M., Dewey, G. K., and Brown, H. K., (2008). Effects of energy density and feeding frequency of complementary foods on total daily energy intakes and consumption of breast milk by healthy breastfed Bangladeshi children. *American Journal of Clinical Nutrition* 88:84–94.
- Jones, G., Steketee, W. R., Black, E. R, Bhutta, A. Z, and Morris, S. S., (2003). Child survival II. *The lancet* 362,65-71.
- Kabahenda, M. K. (2002). Developing an intervention to improve the child-feeding behaviors of rural mothers in western Uganda. Foods and Nutrition. Athens University of Georgia, pp. 150, 2002, MSc Thesis.
- Kikafunda, J. K., Walker, A. F., and Tumwine, J., (2003). Weaning foods and Practices in Central Uganda; Cross sectional studies. *African Journal of Food, Agriculture, Nutrition and Development* 3 (2).
- Kimmons, E. J., Dewey, G. K., Haque, E., Chakraborty, J., Osendarp, M. J. S, and Brown, H. K., (2005). Nutrient Intakes among Infants in Rural Bangladesh Are Attributable to Low Intake and Micronutrient Density of Complementary Foods. *Journal of Nutrition*. 135, 444–451.
- Koletzko, B., (2000). Complementary foods and the development of food allergy. *Journal of Pediatrics* 106 (5), 1285.
- Krebs, N. F and Hambidge, K. M. (2007). Complementary feeding: clinically relevant factors affecting timing and composition *American Journal of Clinical Nutrition*; 85:639S–45S.

- Kumar, D., Goel, N. K., Mittal, C, and Misra, P. (2006). Influence of Infant feed Practices on Nutritional Status of under- five children. *Indian Journal of pediatrics* 73(5), 417-42.
- Kung'u, K. G., Boor, J. K., Ame, M. S., Ali, S. N., Jackson, E. A, and Stoltzfus, J. R., (2009). Bacterial Populations in Complementary Foods and Drinking-water in Households with Children Aged 10-15 Months in Zanzibar, Tanzania. *Journal of Health Population Nutrition*, 27(1), 41–52.
- Lartey, A., Manu, A., Brown, H. K, Peerson, M. J., and Dewey, G. K. (1999). A randomized, community-based trial of the effects of improved, centrally processed complementary foods on growth and micronutrient status of Ghanaian infants from 6 to 12 months of age. *American Journal of Clinical Nutrition* 70 (3), 391-404.
- Lartey, A. (2008). Maternal and child nutrition in Sub-Saharan Africa: challenges and interventions. *Proceedings of the Nutrition Society* 67, 105–108.
- Laswai, H. M, and Kulwa1, K. (2010). Nutrient content and acceptability of soybean-based complementary food. *African Journal of Food, Agriculture, Nutrition and Development* 10(1), 2040-2049.
- Lawrence, A. R. (2005). Supporting Breastfeeding/Early Childhood Social and Emotion Development Encyclopedia on Early Childhood Development. Centre of Excellence for Early Childhood Development.
- Léder, I. (2004). Sorghum and Millets, in Cultivated Plants, Primarily as Food Sources, [Ed. György Füleky], in Encyclopedia of Life Support Systems (EOLSS), Developed under the Auspices of the UNESCO, Eolss Publishers, Oxford UK.
- Linkages, (2006). *Facts for Feeding, Feeding Infants and Young Children During and After Illness*. Academy for Education Development 1825 Connecticut Avenue, NW, Washington, DC.

- Lukmanji, Z., Hertzmark, E., Mlingi, N., Assey, V., Ndossi, G and Fawzi, W., 1st Edition Nov. (2008). *Tanzania Food Composition Tables*. ISBN: 978 - 9987- 9071-1-3.
- Lung'aho, G. M., and Glahn, P. R. (2009). *Invitro* estimates of iron bioavailability in some Kenyan complementary foods. *Food and nutrition bulletin*, 30(2), 145-152.
- Lutter, C., (2003). Pan American Health Organization; *Meeting the Challenge to Improve Complementary Feeding*. SCN News #27—December 2003.
- Magala-Nyago, C. M., Kikafunda, J. K, Mwasaru, M. A., Kenji1, G. M and Connelly, R. K, (2005). Evaluation of nutritional value of malted and extruded finger millet based complementary foods. *African Crop Science Conference Proceedings* 7, 677-686.
- Mamiro, P., Kolsteren, P., Camp, J., Roberfroid, D., Tatala, S., and Opsomer, A. (2004). Processed Complementary Food Does Not Improve Growth or Hemoglobin Status of Rural Tanzanian Infants from 6–12 Months of age in Kilosa District, Tanzania. *The American Society for Nutritional Sciences* 134, 1084-1090.
- Martinez B. C., de Zoysa, I. & Glass R. I. (1992). The magnitude of the global problem of diarrheal disease: A ten-year update. *Bulletin of WHO* 70, 705-14.
- McGuire, J. (2002). *Best Practices in Addressing Micronutrient Malnutrition*, The World Bank, 1818 H Street NW, Washington DC.
- Milman, A., Frongillo, A. E., Mercedes de Onis and Ji-Yun Hwang, (1994). Differential Improvement among Countries in Child Stunting Is Associated with Long-Term Development and Specific Interventions. *The Lancet* 344(8918), 288-93.
- Monte, M. G. C., and Giugliani, R. J. E. (2004). Complementary Feeding, Breastfeeding, Child Nutrition, Diet, Weaning. *Journal of Pediatrics (Rio Journal)* 80(5), S131-S141.

- Moreno, L., Puntis, J., Rigo, J., Shamir, R., Szajewska, H., Turck, D. and Goudoever, J. (2008). Complementary Feeding: A Commentary by the ESPGHAN Committee on Nutrition. *Journal of Pediatric Gastroenterology and Nutrition* 46, 99–110.
- Murphy, S. P, and Allen, H. L. (2003). Supplement: Animal Source Foods to Improve Micronutrient Nutrition in Developing Countries. Nutritional Importance of Animal Source Foods. *Journal of Nutrition*, 133: 3932S-3935S.
- Mutambi, R., Hasunira, R., Oringa, V. (2007). Inter-sectional action on health in a conflict situation – Case of Kitgum District-Uganda. Inter-sectoral action on health in a conflict situation,
- Namugumya, S. B., Ruzaaza, G., Mwadime, R., Sethuraman, K., and Okello, E. (2010). Opportunities for Addressing Malnutrition in Kitgum and Pader Districts in Northern Uganda. FANTA 2 Report , Washington DC:AED/FANTA- 2.
- Neumanna, C., Harrisa, M. C, and Rogers, M. L. (2002). Contribution of animal source foods in improving diet quality and function in children in the developing world. *Nutrition Research*, 22, 193–220.
- Neumann, G. C., Murphy, P. S., Gewa, C., Grillenberger, M., and Bwibo, O . N. (2007). Meat Supplementation Improves Growth, Cognitive, and Behavioral Outcomes in Kenyan Children. *Journal of Nutrition*, 137, 1119–1123.
- Nwanze, F. K. (2010). The world is fed on the backs of rural women. Millennium Development Goals. This is Africa. A global Perspective Special Report. FT Business Financial Times.
- Ogunba, O. B., (2010). Diet Diversity in Complementary Feeding and Nutritional Status of Children aged 0 to 24 Months in Osun State, Nigeria: A Comparison of the Urban and Rural Communities. *Infant, Child, & Adolescent Nutrition* 10, 1177/1941406410385451.

- Olwedo, A. M., Mworozzi, E., Bachou, H., Orach, G . C. (2008). Factors associated with malnutrition among children in internally displaced person's camps, northern Uganda. *African Health Sciences* 8 (4), 244-252.
- Our global efforts to prevent malnutrition during the first 1,000 days. USAID'S Infant & Young Child Nutrition Project Report, March 2012.
- Owino, V. O., Amadi, B., Sinkala, M., Filteau, S., Tomkins, A., 2008. Complementary feeding practices and nutrient intake from habitual complementary foods of infants and children aged 6-18 months old in Lusaka, Zambia. *African Journal of Food, Agriculture, Nutrition and Development*, 8(1), 28-47.
- PAHO/WHO, (2001). *Guiding principles for complementary feeding of the breastfed child*. Washington, D.C: Division of Health Promotion and Protection Food and Nutrition Program, 525 Twenty-third St. N.W., 20037.
- PAHO/WHO, (2003). *Guiding principles for complementary feeding of the breastfed child*. Division of Health Promotion and Protection Food and Nutrition Program. 525 Twenty-third St. N.W., Washington, D.C. 20037.
- Palmer, G. (2009). *What is complementary feeding? A philosophical reflection to help a policy process*; A discussion paper developed for the International Baby Food Action Network (IBFAN).
- Pãšrez-escamilla, R., Sofia segãoeera-millã•n, S., Canahãoeati, J, and Allen, H. (1996). Pre-lacteal feeds are negatively associated with breast-feeding outcomes in Honduras. Community and International Nutrition. *Journal of Nutrition*. 126, 2765-2773.
- Petty, C and Savage, K. (2007). *Livelihoods in Crisis: a longitudinal study in Pader, Uganda* (Inception Report, 2007).

- Poggensee, G., Schulze, K., Moneta, I., Mbezi, P., Baryomunsi, C and Harms, G. (2004). Infant feeding practices in western Tanzania and Uganda: implications for infant feeding recommendations for HIV-infected mothers. *Tropical Medicine and International Health* 9 (4) 477–485.
- Reilly, J. J., Ashworth, S. & Wells, J. C. (2005). Energy intake in the exclusively breast-fed infant age 3–6 months from developed countries: A systematic review. *British Journal of Nutrition* 94, 56–63.
- Saha, K. K., Frongillo, A. E., Alam, S. D., Arifeen, E. S., Persson, A. K., Rasmussen, M. K. (2008). Household Food Security Is Associated with Infant Feeding Practices in Rural Bangladesh. *Journal of Nutrition*.138: 1383–1390.
- SARA Project and Manoff Group, (1997). *Designing by Dialogue: Consultative Research for Improving Young Child Feeding*. Washington: AED.
- Scott, A. J, Binns, W. C., Graham, I. K and Oddy, H. W. (2009). Predictors of the early introduction of solid foods in infants: results of a cohort study. *Bio-med central Pediatrics*, 9:60:10.1186/1471-2431-9-60.
- Serge, T. (2001). Complementary feeding of infants in developing countries: How to design appetitable transitional foods? A Satellite Meeting to the 4th Pangborn Sensory Science Symposium held in Dijon, France.
- Shamima, A. (2010). Duration of Breastfeeding and its correlates in Bangladesh. *Journal of health, population and Nutrition*28 (6), 595.
- Sharma, M and Kanani, S. (2006). Grandmothers' influence on child care. *Indian Journal of Pediatrics*; 73(4), 295-298.

- Simondon, K. B and Simondon, F. (1997). Age at introduction of complementary food and physical growth from 2 to 9 months in rural Senegal. *European Journal of Clinical Nutrition*. 51(10), 703-7.
- Taj, R and Sikander, S. K., (2003). Effects of Maternal Depression on Breast-Feeding. *Journal of Pakistan Medical Association* 53, 8.
- Tatone-Tokuda, F., Dubois L., Manon, Girard, M., (2009). Psychosocial Determinants of the Early Introduction of Complementary Foods. *Health Education & Behavior* 36(2): 302-320.
- Taylor, A. (1998). Malnutrition in Uganda, a review of the causes and discussion of NECD program implications (for Save the Children UK). Kampala, Save the Children.
- The 2008 Uganda food consumption survey. Determining the Dietary Patterns of Ugandan Women and Children. (www.gainhealth.org/reports/2008-uganda-food-consumption-survey)
- Turyashemererwa, F. M., Kikafunda, J. K and Agaba, E. (2009). Prevalence of early childhood malnutrition and influencing factors in peri- urban areas of Kabarole district, western Uganda. *African Journal of Food, Agriculture, Nutrition and Development* 9 (4), 975-989
- Uganda Bureau of Statistics (UBOS), (2001). Uganda demographic and health survey. Macro international Inc Calverton, Maryland, USA.
- Uganda Bureau of Statistics (UBOS), (2006). Uganda Demographic and Health Survey. Macro international Inc Calverton, Maryland, USA.
- Uganda Bureau of Statistics (UBOS), (2011). *Uganda Demographic and Health Survey*. Macro International Inc Calverton, Maryland, USA.
- Uganda Food and Nutrition Council (UFNC), (2000). National Food and Nutrition Policy: Background Document. Final Draft.

- Uganda Nutrition Profile, (2010). Nutrition and Consumer Protection Division, FAO, 2010.
- UNDP, (2008). Rural Women in a Changing World: Opportunities and Challenges. Women 2000 and beyond.
- UNICEF, (2007). The State of the World's Children 2007: Women and Children – The double dividend of gender equality.
- Vernarelli, A. J, Mitchell C. D, Rolls J. B., and Hartman J. T. (2013). Methods for calculating dietary energy density in a nationally representative sample. *Procedia Food Science* 2, 68 – 74.
- Von Braun, J., (2008a). Food Summit: Some Progress but More Needs to be done. (Press Statement Release, June 6, 2008). Washington, DC: International Food Policy Research Institute. Available online: <http://www.ifpri.org/pressrel/2008/20080606.asp>
- Wamani, H., Nordrehaug, Peterson, S., Tylleska, T and Tumwine, J. K. (2005). Infant and Young Child Feeding in Western Uganda: Knowledge, Practices and Socio-economic Correlates. *Journal of Tropical Pediatrics Advance Access* 51(6)356-361.
- WHO, (1968). Interactions of Nutrition and infection. WHO monograph series No. 57
- WHO, (1985b): Energy and protein requirements. Report of a Joint FAO/WHO/UNU Expert consultation, Technical Report Series 724.
- WHO/UNICEF, (1998). Complementary feeding of young children in developing countries: a review of current scientific knowledge.
- WHO, (2011). Guidelines on optimal feeding of low birth-weight infants in low- and middle income countries. WHO Library Cataloguing-in-Publication Data. ISBN 978 92 4 154836 6 (NLM classification: WS 120). (www.who.int)

WHO/UNICEF, (2008). ‘Strengthening action to improve feeding of infants and young children 6 - 23 months of age in nutrition and child health programmes’
(http://whqlibdoc.who.int/publications/2008/9789241597890_eng.pdf)

ANNEXES

ANNEX 1: Focus group Guide for complementary feeding practices of children 6-11 months in Kitgum and Pader Districts

1. Introduction of Other foods apart from breast milk

- 1.1 How many of you are currently breast feeding?
- 1.2 How long did you exclusively breastfeed your child? (Probe for pre-lacteals at birth, if yes, why?)
- 1.3 At what age do you start giving foods or fluids other than breast milk?

2. Foods commonly used and preparation methods

- 2.1 What foods are usually given to children other than breast milk (Probe for all foods given to children less than 23 months)?
- 2.2 Do these foods (solids and liquids) differ with the age of the child? If so, why?
- 2.3 What are the usual food (solids & liquids) recipes given to children 6-11 months? Rank the foods to get the six most common
- 2.4 Why are children given these particular foods?
- 2.5 Describe how they are prepared (six mothers will be asked to describe how they prepare at least 6 of the common recipes and others asked for any modifications they do from the usual).
 - 2.5.1 Probe on amount of ingredients used (water added?), time spent, who usually does the preparation, how many servings, e.g. no. of cups, no. of times of eating of the same food, how many times food is prepared.
- 2.6 What challenges do you experience in preparing foods for these children?
- 2.7 Any comments of the taste, consistency, texture and smell of the food (food preference)?
- 2.8 Does the food prepared differ with time of day or day of the week?
- 2.9 Where are the ingredients used to prepare the foods obtained?
- 2.10 Who in the household decides the type of food prepared for the child?
- 2.11 Are there any special foods used to feed the sick child? Why? What are they? How are they prepared?
Obtain commitment from some mothers to demonstrate how they usually traditionally prepare these recipes later.

3. Feeding the child

- 3.1 How many times is the child fed?
- 3.2 Does the food given differ with time of the day (morning, afternoon and evening)? (Probe what foods and why).
- 3.3 How much is served?
- 3.4 Does the child have their own plate/cup to feed from?
- 3.5 Who is usually present when the child is feeding?
- 3.6 Does the child usually finish the food?

- 3.7 What do you do when a young children refuses to eat?
- 3.8 What factors lead to a child not feeding properly?
- 3.9 Is there a known age or growing stage when children usually experience this failure to feed properly?
- 3.10 What other challenges do you experience in feeding children?
- 3.11 How do you address these challenges?
- 3.12 What time do you usually breastfeed?

ANNEX 2: Focus group guide for modification of complementary foods commonly utilized for children 6-11 months in Kitgum and Pader Districts

Mother care groups (Informed mothers), VHT, Health workers, Teachers, grandmothers

Reference will be made to FDG for mothers

- 4.1 When do mothers start giving other drinks/fluids and foods other than breast milk to their children?
- 4.2 What are the available foods in this community?
- 4.3 Do the foods given to children differ with age of the child? What are the foods commonly given to children of 6-11 months (Probe for foods given at 6, 7, 8, 9, 10, 11 months) and which ones (at least 6 inclusive of the drinks) do they prefer?
- 4.4 How are these foods traditionally prepared? Is there any challenge/problem with these foods in regard to meeting requirements for children 6-11 months? (*Seasonality, nutrient content, time of preparation, access to raw materials etc*)
- 4.5 Are there other locally available ingredients that were traditionally be used to feed the children of this age group but are not being used? If yes, which are they and why are they not being used?
- 4.6 How would you modify the food mentioned using locally available ingredients and Why?
- 4.7 What are the challenges most likely to influence modification and adoption of these recipes?
- 4.8 How can these challenges be addressed?
- 4.9 What are the opportunities to facilitate recipe modification and adoption? List the modified foods both within and out of the area
- 4.10 Why are certain food combinations (if any) not tried?
- 4.11 How long would it take to prepare the modified meals?

4. Product acceptability

- 5.1 Do mothers feel they can try the recipe at home? Why and why not? (Probe on perceived ease of preparation and time needed).
- 5.2 What is the products' acceptability in terms of appearance, consistency, smell and flavor products?
- 5.3 Demonstration: Observation of child's response to new product, mother's perception to the product, possible long term effects of eating this new recipe, frequency of feeding children of this age.

ANNEX 3: Semi-structured interviews for fathers of children 0-23 months, grandmothers, and mothers above 18 Years

Interview identification information

1. Interviewee
2. Interviewer's name
3. Interview date

1.0 Social transitions:

- 1.1 Could you describe what has changed in your household as a result of the conflict? [If transitioning from IDP camp to home]
- 1.2 How has been the transition from the IDP camp to your home?
- 1.3 What are the challenges you and your family face?
- 1.4 Are things better or worse now than before?
- 1.5 What are the problems or changes you see and face?
- 1.6 Can you rank for us from biggest to smallest the challenges you face?
- 1.7 How have things changed at the community level in how you relate to your neighbors and friends?
- 1.8 Do people relate or interact with each other the way they used to before or have these things changed? If so how?
- 1.9 How have things changed between the elders in the community and younger people?
- 1.10 Have there been changes in the level of aid to your family?
- 1.11 How has this affected your family?
- 1.12 Can you share anything else about these changes?

2.0 Social networks and social capital

- 2.1 How does that work here now between you and your neighbors, friends or family?
- 2.2 How has this changed from before?
- 2.2 Are there any groups or associations here?
- 2.3 Are you a member of a group? What does the group do?

3.0 Gender considerations

3.1 Has anything changed as a result of the conflict between your wife and you?

3.2 How and why have things changed?

3.3 Would you say things are better for you now or are they more difficult?

3.4 Are you able to provide for your family?

3.5 Has this improved or are things more difficult now?

3.6 Who has more control over resources in the household?

3.7 Who has the final say over decisions in your house?

3.8 Is your wife involved? How do you include her in decision-making?

3.9 Has anything changed?

4.0 Community and household/individual perceptions of livelihood opportunities and income sources: *Types of livelihood activities for men and women, by age*

4.1 What types of income-earning activities do you engage in?

Income generating activities the respondent is involved in included:

4.2 What income-earning activities does your wife or other family members engage in?

4.3 Do you face any particular difficulties in accessing income-earning opportunities? What are the barriers?

4.4 Do others in your family face any difficulties?

4.5 Do the women in your family face any difficulty?

4.6 How do income-earning opportunities change for you over one year?

4.7 How many days are you employed or do you earn income per month, and how does this change by season?

4.8 How many days were you employed/or earn income in the last month?

4.9 How many days were the women in your family employed/or earn income per month and how does this change by season?

5.0 Community and household/individual perceptions of food security

5.1 *Food production/shortage*

5.1.1 Does your family have access to land?

5.1.2 What food crops does your family grow?

5.1.3 Are there any difficulties in growing crops here?

5.1.4 If yes, what are they?

5.1.5 Do you grow any crops?

5.1.6 If yes, what are they?

5.1.7 Does your Household experience food shortages?

5.1.8 If yes, what period of the year does your HH experience food shortages?

5.1.9 Why does food shortage occur?

5.1.10 Is your family able to produce sufficient food to feed your family?

5.1.11 How do you supplement the family diet during food shortage?

5.2.0 *Perceptions of food insecurity*

5.2.1 How big or small a problem is lack of food in your house?

5.2.2 What usually happens when there is a lack of food?

5.2.3 How does your HH cope with food shortage?

5.3.0 Food distribution within families

5.3.1 How is food distributed within your family?

5.3.2 Is it given to households within a compound?

5.3.3 Who manages the food storage in your HH?

5.3.4 Do you have access to food through your family?

5.3.5 Can your wife go to get food from the family's granary?

5.3.6 Do you or your wife sell any of the crops you grow?

5.3.7 What do you usually sell?

5.3.8 What do you buy with the income earned from that sale?

6.0 Infant feeding practices

6.1. What do you know about feeding babies?

6.2 Can you tell us how a baby should be fed from birth to the first year?

- 6.3 Can you describe what should be offered when and say why you think so?
- 6.4 Do you ever feed this baby?
- 6.5 If yes, what do you give this baby?
- 6.6 If you do feed this baby, how often do you do so (probe to not frequent at all)?
- 6.7 What are the challenges if any in feeding your baby?
- 6.8 How are decisions made around what to feed a child and when, for example, what happened the last time a
- 6.9 Was there any discussion about this? What was the discussion about?
- 6.10 Were any decisions made?
- 6.11 Who makes the final decision?
- 6.12 Who influences these decisions? (*Rank from is the most to least influential*)
- 6.13 How much influence does the mother of the baby have in child feeding decisions?
- 6.14 Have there ever been any disagreements in how this baby should be fed?
- 6.15 If yes, what happened the last time there was such a disagreement? And how was it resolved?
- 6.16 Who are the people who influence the choices you make about caring for and feeding your baby?
- 6.17 How do they influence you, and why are you influenced by them?
- 7.0 Care of infant and mother** (What role do you play in taking care of your youngest child and his/her mother?)

- 7.1 In your opinion what role should fathers play in taking care of babies? And Why
- 7.2 What is the community perception about a father who participates actively in caring his infant?
- 7.3 What is the community perception about a father who does not participates actively in caring his infant?
- 7.4 Do you ever have to take care of this baby on your own, say if the mother goes out to work or somewhere else? And how often does this happen?
- 7.5 What are the challenges in providing for this baby and the baby's mother?
- 7.6 What does the community expect of you?

7.7 Are you happy with what you are able to do for them?

7.8 If yes, describe what you do, and how this makes you feel

7.9 If no, describe what else you would like to do and the difficulties you face

7.10 Usually, a baby's mother takes care of her baby most of the time, how do you support your baby's mother?

7.9 What do you think of how she feeds the baby?

7.10 If the baby cries, what do you do? (*Probe how quickly or how slowly father responds, e.g., does he wait for someone else to do something first?*)

8.0 Management of malnutrition

8.1 How is your baby's health?

8.2 Has your baby been weighed recently?

8.3 If yes, If yes - what did you learn about the baby's weight at the last weighing?

8.4 Did you go with the mother to visit the health provider the last time?

8.5 Did you get any advice from the health provider?

8.6 If so what did they say? If not, why not?

8.7 What do you do to make sure your baby gains the required weight?

8.8 Did you follow the advise you were given

8.9 Did you have any difficulties following this advice?

8.10 If yes, what were the difficulties?

8.11 Did you yourself follow this advice or was it this baby's mother?

8.12 What did you discuss with her about this baby's health?

9.0 Management of illness

9.1 Has your child been ill in the past two weeks?

9.2 If yes what illness did your child have?

9.3 If no, what types of illness does your child usually get?

9.4 How common or frequent are these illnesses?

9.5 What do you do when your child is sick?

9.6 When do you take the sick child to the health provider (Probe: early or late in illness? Why early? Why late?)

9.7 Who takes the child?

9.8 Does anyone accompany (the caregiver)?

9.9 Is there a difference in treatment seeking by sex of the child - what is the difference?

9.10 If there is a difference why is there a difference?

9.11 What would you say about the quality of care?

9.12 What are the challenges for you to obtain health care for your children? (*Cost, travel time, distance, opportunity cost*)

9.13 Do you go with you wife go to the health center?

9.14 Does your wife face any particular challenges to get health care for the baby (*probe permission, money, transport, being accompanied, needing to borrow, others have to pay*)?

9.15 Do you usually follow the advice and instructions given?

9.16 If yes what makes it so you can follow them?

9.17 If no, why not? Are there any other barriers to treatment?

10.0 Maternal nutrition

10.1 Did the mother of this baby get any special care from you when she was pregnant with this baby?

10.2 What about any special foods or health care?

10.3 If yes - what did she get? If no, why not?

10.4 We know that in every household issue are different, in your household can you tell me who eats first, who eats last? And why?

11.0 Role of/influence of grandmothers and other key family members

11.1 Does this baby's grandmother look after this baby?

11.2 Where does the grandmother live?

11.3 What does she say about how your wife takes care of your baby?

11.4 Has the grandmother voiced any concerns about or for the baby? And what does she say

11.5 In your opinion, how much influence does she have in the advice, care, and feeding of a young child?

11.6 What types of things can she influence? (Probe: care, child feeding, breastfeeding, household decision-making, decision-making about what the mother can and cannot do)

11.7 While grandmothers may have a lot of influence generally, we also know they may have ideas about child care and child feeding that may not fit with what we know is needed today to take care of young children, what are your thoughts about this?

12.8 Would you say her influence is positive or negative?

12.9 Can you give some examples?

12.10 What is the nature of the relationship between the grandmother and your wife?

THE END

Thank you very much for participating in this study

ANNEX 4: Fanta-2 Trials of improved practices (Tips) tool

HOUSEHOLD TRIALS: VISIT 1

BACKGROUND INFORMATION:

Date : ___ ___ / ___ ___ / ___ ___ (dd/mm/yy)

Start time: ___ ___ : ___ ___

Community: _____

Code _____

Interviewer: _____

Code _____

Child's Name: _____

I.D. _____

Age in months: ___ ___

Birth date: ___ ___ / ___ ___ / ___ ___

Sex: _____

Caretaker's Name: _____

Relationship to child: _____

FEEDING AND HEALTH HISTORY:

Explain to the mother that we want to learn about her child's health and feeding.

1. (a) How is the child's health today? (Probe for current or recent illness and symptoms.)

(b) How is the child's overall health? Any problems? (Probe for frequent illnesses and mother's general impression of the child's health.)

2. Generally, how is the child eating?

3. Is child breastfed? ___ (Y/N)

Frequency? Day ___ ___ Night ___ ___

On demand? Day ___ Night ___ (Y/N)

4. Conduct 24-hour recall for all foods and liquids (including water) other than breastmilk and a food frequency for other foods the mother usually gives the child. From the dietary history, you'll know whether the mother knows how much the child eats. These questions on appetite and quantity apply to breastfeeding and other foods. (WILL BE OBTAINED FROM THE RECIPE TRIALS GROUPS)

5. Ask mother about the child's appetite. Who decides when the child will eat and how much (does she leave it up to the child? What cues does the child give?)

6. Does she feel the child eats enough? Why or why not? Does she ever try to get the child to eat more? When? How? Does it work? Do other people have other ways? Can she give examples?

7. Probe on feeding and child appetite during illness. How is the child's appetite when sick? Is this a problem? What can be done?

Thank the mother for her collaboration and make an appointment within the next 24 hours to discuss with her the feeding recommendations for her child.

HOUSEHOLD TRIALS: VISIT 2

ANALYSIS OF DIET – in consultation with the supervisor:

Take a few minutes to look at the dietary information and identify any feeding problems listed on the Assessment and Counseling Guide. Describe the following aspects of feeding and indicate whether or not current feeding is adequate.

Breastfeeding practices:

Feeding frequency:

Amount given:

Quality/variety:

Consistency/thickness:

Active feeding:

Hygiene practices:

1) Problems identified: ____ ____ ____ ____ ____ (list numbers from Assessment and Counseling Guide)

2) Possible recommendations: ____ ____ ____ ____ ____

[Add any other important information the mother has mentioned. Ask if she agrees with your summary.]

3. Problem-solving.

Ask the mother if she would be willing to try something new to improve the diet for the child's health and strength.

Ask if she has any ideas – make general suggestions and try to get her to come up with some possible improvements.

Use the recommendations listed on the guide under the problems you have identified as suggestions as to what improvements the mother could try.

Discuss the appropriate recommendations for the child's age and current feeding patterns, based on the Assessment and Counseling Guide.

Record as much detail as possible about the mother's responses to the recommendations. Negotiate with the mother so that she chooses the practice she would be willing to try for a few days.

RECOMMENDATIONS:

1. Recommendation no. _____:
2. Specific food options/practice suggested:
3. Mother's response:
4. Willing to try? Why or why not?
5. Any other circumstances under which she would try the recommendation? When? What modifications?
6. Summarize what the mother has agreed to try:
7. Ask her to explain the practices to you and make sure she understands and agrees. Ask if she has any questions or comments (record them).

Write what she is going to try on a "Child Feeding/practice Reminder" slip and give it to her to keep. Arrange a date for follow-up visit (see schedule). You may ask the mother when is a convenient time of day to meet her and try to arrange that she will be home when you come.

Follow-up: _____

Thank mother for spending time answering your questions and encourage her to really try the new practice.

Time finished: __ __: __ __

HOUSEHOLD TRIALS: VISIT 3

DIETARY ASSESSMENT

Begin with a 24-hour recall, to see if there is any change since the first visit. [Insert 24-hour recall table, as in form for initial interview.]

FEEDBACK ON RECOMMENDATIONS:

Refer to summary of the agreement made with the mother during the first visit (last page of form). List each practice she agreed to try, and ask the questions below.

1. Recommendation
2. Has the mother tried it? ____ (yes/no)
3. If no, what are her reasons? Probe why.
4. If yes, did she like it? ____

What did she like about it?

What didn't she like?

5. How does she feel the child responded?
6. Did she modify the recommendation? How? Why?
7. Did other people say anything about it? Who? What did they say?
8. Will she continue the recommended practice? Why or why not?
9. Would she recommend it to others? How would she convince them to try it?

Encourage mother to continue practice and ask if she has any questions or comments. Provide counseling or information as needed. Thank her for her participation in the study.

Time finished: __ __: __ __

HOUSEHOLD TRIALS: RECRUITMENT SHEET

Community: _____ Interviewer: _____

Description: _____

I.D.	Age	Name of child, caregiver, location of household	Date of visit 1	Date of visit 2	Date of visit 3

SUMMARY HOUSEHOLD TRIAL TABULATION FORM

AGE GROUP: _____

Community: _____

Interviewers: _____

No. interviewed: First visit _____
 visit _____

Second visit _____

Third

I.D.	Age	Feeding Problems	Recommendations Offered	Reasons/ Reactions	Tried	Recommendations Agreed	Outcome/Reactions / Changes	Adopted

ANNEX 5: COUNSELING GUIDELINES AND RECOMMENDATIONS FOR TIPS

Age	Feeding problems	Ideal /recommendations
6-9	<p>Dilute or watery foods with low nutrient density</p> <p>Delay introducing complementary feeds</p> <p>Use of utensils not a bottle and hygiene during food preparation and handling</p>	<p>√ Continued breastfeeding on demand</p> <p>√ Gradual introduction of soft nutritious complementary foods</p> <p>√ Total of approximately 280kcal per day from complementary foods</p>
9-12	<p>Low frequency of feeding</p> <p>Low nutrient density, starchy or dilute foods continued</p> <p>Lack of variety</p> <p>Childs' refusal or lack of interest in eating</p>	<p>√ Continued breastfeeding</p> <p>√ Increasing variety of foods including mashed family foods, fruits and vegetables</p> <p>√ Total of approximately 450kcal per day from complementary foods</p> <p>√ Supervision and encouragement to eat during feeding</p>
7-24	<p>Lack of persistence of coaxing the child with poor appetite</p> <p>Quantity of food consumed</p>	<p>√ Careful monitoring of child, encouragement and assistance with feeding to ensure adequate intake</p>
Sick child	<p>Breastfeeding and feeding drastically reduced or stopped</p> <p>Period of convalescence not recognized</p> <p><u>Feeding styles</u></p> <p>Bottle or hand feeding</p> <p>Communal feeding</p> <p>Special foods preparation for the child</p>	<p>√ Continued or increased frequency of feeding or regular foods or switch to soft foods</p> <p>√ Provide special foods or more food for several days once the child feels better</p> <p>√ Cup or spoon feeding</p> <p>√ Individual serving</p> <p>√ To have foods specially prepared for them</p>

	<p>Who feeds the child food</p> <p>Childs' meal pattern vs adults'</p> <p>Preparation practices(eg dilute porridges)</p> <p>Breastfeeding frequency</p> <p>Serving size</p> <p>Feeding frequency</p> <p>Variety</p>	<ul style="list-style-type: none"> √ Mother or another adult √ To be more frequent √ Thicken the porridge by using less water √ Addition of other ingredients eg sugars, fats/oils √ At least 8 times a day √ Breastfeed on demand √ To be large enough and the child encouraged to eat all the food √ Child to eat at least 3 times a day and when sick at least 5 a day √ At least 5 food groups √ Improve the kind of foods to provide all the nutrients √ Addition of other ingredients eg sugars, fats/oils
--	---	---

REFERENCE CHILD

US321. Names of reference child :

IND ID

--	--	--

US322. Age in mnths of reference child:

--	--

(confirm with sample list)

US323. Age Category of reference child

--

1=6-8 mnths;
2=9-12 mnths
3= 12-23 mnths

US324. Relationship of respondent to reference child

--

1=Mother 4=Child sibling 7=Other
2=Father 5=Other adult relative

US325. Was (USE NAME) sick yesterday?

--

0=No
1=Yes (If child was NOT sick, skip to US201)

US326. If the child was sick, what was (NAME) suffering from?

Codes: 0=No 1= Yes

(a) Cough

--

(b) Diarrhoea

--

(c) Fever

--

(d) Other

--

US327. I would like to ask you about NAME's appetite yesterday.

--

1= Appetite was usual for my child
2= Less than usual for my child
3= More than usual for my child

If appetite was usual skip to UC203

US328. If less than usual, what do you think were the reasons

--

1= Child was sick
2 = Child did not like the food
9 = Don't know

US329. If more than usual, what do you think were the reasons

--

1= yesterday was a feast day
2 = Child was fed differently yesterday
9 = Don't know

US330. Was this child (USE NAME) breastfed yesterday?

--

0= No If yes, how many times?
1= Yes

--

3=NA-child off breast milk

US 331. Did this child (USE NAME) take Iron supplements yesterday ?

--

0=No
1=Yes

US 332. In the last six months, has (NAME) taken any vitamin A capsule?

--

0=No
1=Yes

FIRST PASS			SECOND PASS			THIRD PASS				
A		Food Code	Food item or name of dish	Description	B		C		Quant (See)	
Time period	Episode #				How was it prepared before eating		Write out quantity and units	Measurement		
USI04	USI05				USI08	USI08		method		Grams
		USI06	USI07	USI08	USI11	USI11A	USI12			
01										
02										
03										
04										
05										
06										
07										
08										
09										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										

A
 1=Morning
 2=Mid-day
 3=Afternoon
 4=Evening

B
 01=Raw
 02=Boiled in water, not drained
 03=Boiled in water then drained
 04=Boiled without added water
 05=Steamed
 06=Stir-fried in oil
 07=Deep fried in oil
 08=Roasted
 09=Baked

10=Roasted & boiled
 11=Deep fried & boiled
 12=Stir-fried & boiled
 13=Steamed & deep fried
 14=Steamed & roasted
 99=Don't know

C
 1=Weight of actual food
 2=Weight of playdough
 3=Volume of food
 5=Size
 6=Length
 7=Diameter

Recipe Number:

Name of person who cooked the dish _____ IND ID | | |

Dish code: see food code list

Name of the Dish _____

Final Volume of dish _____

FIRST PASS		SECOND PASS		THIRD PASS			
Food Code (See Food Code List)	Name of ingredient	Description	F State of ingredient when added	G Amount of ingredient in the			
				Measurement		Grams	Millilitres
	US106	US107	US108	Write out quantity and units US111	method US111A	US112	US114
01							
02							
03							
04							
05							
06							
07							
08							
09							
10							
11							
12							
13							
14							
15							

F & I

- 01=Raw
- 02=Boiled in water, not drained
- 03=Boiled in water then drained
- 04=Boiled without added water
- 05=Steamed
- 06=Stir-fried in oil
- 07=Deep fried in oil
- 08=Roasted
- 09=Baked

- 10=Roasted & boiled
- 11=Deep fried & boiled
- 12=Stir-fried & boiled
- 13=Steamed & deep fried
- 14=Steamed & roasted
- 99=Don't know

G

- 1=Weight of actual food
- 2=Weight of playdough
- 3=Volume of food
- 5=Size
- 6=Length
- 7=Diameter

H

- 1=Small size
- 2=Medium size
- 3=Large size
- 4=Uniform size
- 5=Yellow spoon (1 T)
- 6=Violet spoon (1/2)
- 7=Green spoon (1 ts)
- 8=Small "Kendo"
- 10=Large "Kendo"

MI. FOOD CONSUMPTION (RECALL: LAST 7 DAYS)

Now I want to ask you about food consumption by [NAME OF REFERENCE CHILD] since [REFERENCE DATE].

HHID | _____

TODAY'S DATE (dd/mm/yyyy): ____/____/____

REFERENCE DATE ____/____/____

M00 F O O D C O O D E	M01 Have any members of your household purchased, received without purchasing, or consumed [FOOD ITEM] in the last 7 days, excluding [FOOD ITEM] consumed outside the home?	M02 During the past 7 days, how many days did [NAME OF REFERENCE CHILD] eat [FOOD ITEM]? Meaning, how many days, starting with [NAME OF DAY] a week before yesterday, did the child eat [FOOD ITEM]?	PURCHASE M03 How much [FOOD ITEM] did you purchase in the last 7 days?	OWN STOCK M04 How much [FOOD ITEM] did your household consume from its own stock in the last 7 days? By "stock" I mean food that was obtained more than 7 days ago from your own farm production or from previous purchases or transfers.	RECEIVED WITHOUT M05 How much [FOOD ITEM] did your household obtain without purchase in the last 7 days? What I mean by other sources is from: household production, household business, in kind pay, barter, or gifts in the last 7 days.
	COMPLETE QUESTION M02 FOR EACH FOOD ITEM FIRST, THEN ANSWER QUESTIONS M03-M09 FOR EACH FOOD ITEM YES... 1 NO... 2				
1	Sweet Potatoes(all forms)				
2	Cassava (all forms)				
3	Rice				
4	Maize (grains)				
5	Maize (cobs)				
6	Maize (flour)				
7	Bread / Pancakes/ Biscuits, Cookies				
8	Millet				
9	Sorghum				
10	Sim sim				
11	Meat (beef, pork, sheep, goat, rabbit, edible rat)				
12	Chicken				
13	Liver from any animal				
14	Small fish (with liver intact)				
15	Eggs - with yolk				
16	Fresh Milk				
17	Cooking oil				
18	USAID				
19	Ghee				
20	Margarine, Butter, etc.				
21	Snacks fried in oil (Chappatis, Mandazis, Donuts, etc.				
22	Meals cooked/fried in oil or with oil				
23	Passion Fruits				
24	Mangoes				
25	Pumpkin Leaves				
26	Pumpkin				
27	Papaya				
28	Avocado				
29	Jackfruit				
30	Cow pea leaves (bojo)				
31	Amaranth Leaves				
32	Yams Leaves				
33	Nakati Leaves				
34	Dark Green Leaves (all kinds)				
35	Carrots				
36	Beans (all kinds)				
37	Bean Leaves				
38	Groundnuts or Groundnuts Paste				
39	Sugar				
40	Salt				
41	Ongu				
42	Boo				
43	Alaju				
44	Boke okwee				
45	Malakwang				
46	Bugga				
47	Taki (malakwang seeds)				
48	Nywen				
49	Lawinya (moo-yao&gnut paste)				
50	Honey (kic)				
51	Sim sim				
52	white ants (ngwen)				