



Famine Early Warning Systems Network (FEWS NET)

INTEGRATED NUTRITION AND RETROSPECTIVE MORTALITY SURVEY

Yida Refugee Camp
Unity State, South Sudan



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DISCLAIMER

The author's views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

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- UNHCR
- UNICEF, Juba and Unity State
- Samaritan Purse
- IRC, Yida field office
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- Yida Camp Administration
- ACF Juba team

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LIST OF ACRONYMS

ACF-USA	Action Contre la Faim-USA (Action Against Hunger-USA)
CMR	Crude Mortality Rate
CMAM	Community Management of Acute Malnutrition
CI	Confidence Interval
ENA	Emergency Nutrition Assessment
EPI	Expanded Program on Immunization
FCS	Food Consumption Score
FGD	Focus Group Discussion
FSL	Food Security and Livelihood
GAM	Global Acute Malnutrition
GFD	General Food Distribution
HH	Household
IDP	Internally Displaced People
MAM	Moderate Acute Malnutrition
MOH	Ministry of Health
MUAC	Mid-Upper Arm Circumference
N	Number
NCA	Norwegian Church Aid
NCHS	National Centre for Health Statistic
OTP	Outpatient Therapeutic Program
PHCC	Primary Health Care Centre
PPS	Probability proportional to size
PHCU	Primary Health Care Unit
SAM	Severe Acute Malnutrition
SFP	Supplementary Feeding Program
SMART	Standardized Monitoring and Assessment of Relief and Transitions
SP	Samaritan Purse
TFP/C	Therapeutic Feeding Program/Centre
UNICEF	United Nations Children's Fund
U5MR	Under-Five Mortality Rate
WASH	Water Sanitation and Hygiene
WFH or W/H	Weight for Height
WFP	World Food Program
WHO	World Health Organization

SECTION I

EXECUTIVE SUMMARY

A. Introduction

South Kordofan population has heavily been affected by the clashes between the Sudan Armed Forces and the Sudan People's Liberation Movement-North that has driven thousands of residents of South Kordofan across the border into Yida refugee camp with a few settled in Nyiel and Pariang. The camp is being managed by UNHCR.

Yida refugee camp is now hosting over 60,000 refugees according to the United Nations High Commission on Refugees (UNHCR); the Camp population doubled since April, 2012 when there were 27,500 refugees. In addition to that, the camp is experiencing an in-flow of 300 – 500 people every day, many of the new arrivals reach the registration point exhausted, weak and even malnourished.

Yida refugee camp is located in Pariang County in the Northern part right at the border with South Kordofan. The County is in the northern part of Unity State and lies south of Southern Kordofan State and surrounded by Abiemnhom, Rubkona, Guit, Fangak and Panyikang counties to the South all of Unity State.

The camp currently has a number of organizations that are responding to the humanitarian needs in the camp. These include UNHCR, WFP, MSFF, IRC, Samaritan Purse, CARE, and Non-violent Peace and Solidarities. Their services are focused on primary health care, Nutrition, WASH, food aid/ distribution, protection, shelter, education and reproductive health.

The onset of rains has set hurdles in an already complex and challenging humanitarian emergency response. This has hampered movement and logistical support by cutting out the camp from the nearest transport and communication hub i.e. Bentiu. With continued rains, in the recent days, Sanitation and hygiene situation in the refugee camp have become worse, while its population keeps growing rapidly.

B. Methodology

This integrated nutrition and retrospective mortality survey utilized the Standardized Monitoring and Assessment of Relief and Transitions (SMART) methodology and gave recommendations on the basis of key nutrition indicators. Both anthropometric and mortality data were collected during the survey. Food security and WASH questionnaires were administered in each selected household, as per the South Sudan Nutrition Cluster guidelines with some amendments to capture important indicators from UNHCR survey guideline. IYCF information was collected from households with children less than two years using a structured questionnaire. A two-stage cluster sampling with probability proportional to size (PPS) design was employed in this survey.

The sample size for both anthropometric and retrospective mortality survey was determined by using ENA delta. The required data was entered in the planning screen of the ENA delta software. The data used include; estimated prevalence of malnutrition and mortality rate, desired precision, recall period in days, design effect, average household size, percentage of under-five children and non-response households (see Table I). Prevalence of malnutrition was estimated at 22%, which was high because the survey targeted refugee population. The rates in normal scenario could have been higher since there has been protracted conflict in S. Kordofan. But given most of the refugees arrived some time ago, and have had access to some level of food and Nutrition services, a conservative estimate of 22% (in comparison to the global SSD situation, which is emerging from current surveys) is used.

For both Anthropometry and Mortality, and considering the design of 6 teams, 6 days covering 18 households per day per team, the survey totally covered 637 households which were slightly higher than 577 households as calculated by ENA. Second stage (Household selection) utilized modified EPI method. This mainly used since the camp is temporary settlement and listing of households in the village was difficult as we could not use population listing approach that is ACF practice in rural settings.

Table 1: Table of Anthropometric Results

INDEX	INDICATOR		RESULTS ¹
WHO (2006) (n=630)	Z-scores	Global Acute Malnutrition W/H < -2 z and/or edema	21.8% (17.2 - 27.3)
		Severe Acute Malnutrition W/H < -3 z and/or edema	6.1% (4.0 - 9.1)
NCHS (1977) (n=630)	Z- scores	Global Acute Malnutrition W/H < -2 z and/or edema	21.7% (16.8 - 27.6)
		Severe Acute Malnutrition W/H < -3 z and/or edema	2.5% (1.4- 4.3)
Total crude retrospective mortality /10,000/day			0.76 (0.47 - 1.23)
Under five crude retrospective mortality /10,000/day			2.15 (1.31 – 3.50)

Selected Health, WASH and FSL results are summarized as follows:

Health indicators: The survey results indicated that only 21.6% received Vitamin A capsule and 80.3% received measles vaccination (through EPI card) and 6.2% by recall. Among the surveyed children 74.5% were sick during two weeks period prior to the survey. Diarrhea and cough constituted to the majority of the illness with 35.2% and 31.8%, respectively. Use of mosquito net for covering children during sleeping hours was only 39.1%.

IYCF: All infants below 6 months of age were reportedly still breastfeeding, in the first three days of life. However, 67.6% of them were already started to consume other foods. Hence, only 26.2% of the infants were exclusively breastfed as per the WHO recommendation. The individual dietary diversity for children 6-23 months of age showed 42% of the children to consume less than 3 times in a day. Besides, the majority of children (80.6%) were consuming only one food group. Therefore, consumption of different food groups by children in the households fall on the low dietary diversity (<= 3 food groups).

- All households in Yida camp depend on food rations from WFP. Almost all of the respondents reported the main source of food as food rations. The main food groups eaten are cereals and pulses with very limited animal proteins and without vegetables and fruits. 76.2% of households have poor or borderline food consumption.
- The camp occupants are mainly served water from 7 boreholes (4 mechanized pumps and 2 hand pumps and 1 used mainly by MSFF for the PHCC). This therefore forms the main water source as reported by 88.3% of the respondents with 11.7% reporting using dam or ponds.
- Waiting time at the water point is reported to be the main challenge and thus most of the time spent on fetching water is waiting on the long queues. In the 626 households covered; 9.3% take

¹ Results in brackets are expressed at 95% Confidence Interval.

less than 30 minutes, 13.7% taking >30min to <1hr, 31.9% taking >1hr to < 2hr then 34.3% taking 2hr to < 4hr = 34.3% and finally 10.7% taking more than 4 hours to fetch water.

- A considerable proportion of the community (53.7%) use unimproved sanitation facilities (designated and undesignated bush area)². Use of latrine was only reported in 44.6% of the sampled households.

C. Next Steps

The prevalence of acute malnutrition in Yida refugee camp observed was high, and far beyond the 15% emergency threshold. The mortality rates reported, especially in children below five years, were also worrying. Especially because sanitation and hygiene situation in the camp suggest that further deterioration is possible. Prompt action to manage the scale of malnutrition is recommended that, among other, will include scaling up nutrition interventions in the camp, improvement of access to water and its quality and well as activities to improve dietary diversity among the refugee population in the camp. Based on the results of the survey, prompt action for proper management of both prevention and treatment of malnutrition is recommended. These include scaling up of nutrition interventions and program linkages in the camp, improvement of access to water and its quality, improved sanitation and hygiene practice, and activities to improve house hold access to food for improving dietary diversification among the refugee population in the camp.

² Core questions on drinking water and sanitation for HH survey, WHO and UNICEF 2006, used for the definition of improved and unimproved sanitary facility

SECTION II

INTRODUCTION

Yida refugees' camp is situated in Pariang County which is one of the nine counties of Unity State in South Sudan. The refugee population in the camp represents the 37 tribes/bomas of South Kordofan in the republic of Sudan. Yida camp is bordering Pariang County to the south west, upper Nile state to the south east and Republic of Sudan to the north at Kaunda. The Yida camp refugees are mainly Nubians from South Kordofan who are predominantly agro-pastoralist and small scale farming remains as their primary determinant of wealth and status. Livestock is sold, is a form of payment of bride price and source of meat. Most of them have Islamic background.

UNHCR estimates the population at Yida refugees' camp to be 62,000. There is still movement ranging between 300 to 500 persons arriving in the camp per day due to food insecurity and lack of water in their place of origin.

Currently there are 3 operational health centers in Yida camp; IRC runs reproductive health centre, and MSF and CARE run the other two health facilities respectively, mainly treatment of patients'. The cases reporting at MSFF health facility mostly suffer from Diarrhea, AWD, ARI and malaria with thresholds of 3 to 4 children under 5 years dying per day. The mortality rate of children under 5 years has increased to 5 children per 10,000 per day and the crude rate doubled at 2 persons per 10,000 in a day. A recent nutrition survey in Warrap State of South Sudan (Gogrial West County) showed U5MR and CMR of 1.10 [0.40-2.98] and 0.75 [0.43 - 1.29], respectively.³

In the recent 4 cases of measles were reported in MSF run clinic with symptoms of rash, fever and eyes. Therapeutic nutrition services are provided by SP through 1 OTP located in the camp and supplementary as well as general feeding programs are provided by WFP and facilitated by SP food aid team. According to SP monitoring data estimated malnutrition rate at 10% of SAM admissions, mostly resulting from diarrhea, lack of food diversification and poor hygiene practices, and many household heads are vulnerable women.

Exclusively breastfeeding remains a challenge in the camp because of the common practice of introducing other infant foods at the age of 2 to 3 months. IRC health reproductive centre trained on breastfeeding, hygiene and family planning among others. In the camp there are 6 water points functioning of which 3 are hand pumps and 3 submersible pumps for 62000 people.

Human waste disposal is very poor as there were only 400 slabs of latrines distributed and used which as per SPHERE standards will serve only 20,000 people, this is only a third of the population, this left part of the population vulnerable and therefore practice open defecation, which may contribute to diseases like diarrhea and ARI. The number of children dying is alarming and 1,200 admitted children with severe acute malnutrition. A study by MSF (July 27, 2012) showed that 82 cases of refugee families had fallen ill over the past few weeks. Food diversity remains as a challenge since there are no varieties of foods in the market. The only source of food in the camp is food ration of sorghum, lentils, oil and salt distributed after every 4 weeks.

There are no proper roads connecting the camp to other states of South Sudan, as well as efficient means of communication. There is unreliable cell phone network which is on and off most of the time.

³ ACF – USA, Nutrition Survey 2012 – Gogrial West, Warrap State

Security situation is volatile from the infiltration of arms in the hands of refugees who fled with their guns into the camp. Since the camp is located at the border between South Sudan and Sudan is always targeted by aerial bombardment between the Sudanese military and Nubian rebels in the republic of Sudan. Almost every night we hear the crackle of gunshots and hovering of Sudanese planes dropping bombs around the border. These terrify the refugees at the border which is just 17 miles away from the camp. Women here in the camp still remain at the grave risk and signs of trauma are observed by the survey team.

SECTION III

OBJECTIVES OF THE SURVEY

A. Primary Objectives

- Assess the prevalence of malnutrition amongst children aged 6 – 59 months (65 -110cm) in Yida refugee camp.
- Determine retrospective crude mortality rate (CMR) and under five mortality rate (U5MR)

B. Secondary Objectives

- To determine infant and young child feeding practices in relation to malnutrition and morbidity
- To assess identifiable socio-economic factors that may be associated with malnutrition (e.g. food access and utilization, sources of incomes, etc.)
- To examine the food security situation and challenges by investigating food adequacy (dietary diversity, meal frequency)
- To assess water, hygiene and sanitation factors that may contribute to malnutrition in children.

SECTION IV

SURVEY METHODOLOGY

A. Geographic target and population group

The survey targeted Yida refugee camp in Unity State of South Sudan. The assessment targeted refugee households with children aged 0-59 months (6-59 months for the anthropometric measurements) and mothers/caretakers of children below 5 years of age as primary respondents to the household assessment questionnaires.

B. Type of survey

Standardized Monitoring and Assessment of Relief and Transition (SMART) methodology was employed to undertake the integrated nutrition and retrospective mortality survey. SMART methodology provides a basic integrated method for assessing nutrition status and mortality rate in emergency situations that provides the basis for understanding the magnitude and severity of humanitarian crises. The SMART methodology draws from core elements of several existing methods and best practices.

Anthropometric measurements and mortality assessments were undertaken simultaneously. In addition IYCF, food security and livelihoods and Water, Sanitation and hygiene data was collected from the households to give a glimpse of the underlying causes of malnutrition in the area. Structured household questionnaire on food security, water and sanitation and selected health practices, including IYCF, were developed from the universally recognized compendium of indicators and standardized at the National Nutrition cluster level for all partners working in the Republic of South Sudan.

C. Sampling Methodology

A two-stage sampling with probability proportional to size (PPS) design was employed for the integrated nutrition survey. The Emergency Nutrition Assessment (ENA) for Standardized Monitoring of Relief and Transitions (SMART) version (June 20th, 2011) was used to determine the sample size using village-level population data.

C.1. First stage sampling

The sample size for both integrated nutrition and retrospective mortality surveys were determined by using ENA delta. The data used on the software included estimated prevalence of malnutrition and mortality rate, desired precision, recall period in days, design effect, average household size, percentage of under five children and 4% for non-response households. Prevalence of malnutrition and mortality were estimated at 20% and 1.5 respectively.

Table 2: Sample size calculation for integrated nutrition and retrospective mortality survey

Data entered on ENA software	Anthropometric survey	Retrospective mortality survey
Estimated prevalence	22.0%	1.0
Desired precision	4.0	0.5
Design effect	1.0	1.0
Recall period		90 days
Average household size	5	5
Percent of under five children	18%	
Percent of non-response	4%	4%
Sample sizes (Households)	577	387

Anthropometric survey: using the above indicated data, minimum sample sizes of 449 children was generated for anthropometric survey.

Mortality survey: A sample size of 1,859 people was required. As the average household size was estimated at 5,387 households were needed to be visited to attain required sample size. Considering the need to survey one cluster per team per day, it was determined to visit only 18 households for mortality data which resulted in selection of 36 clusters.

All children under 5 years in all selected households were measured regardless of attaining the required number of children per cluster for the last household.

Clusters were randomly selected using ENA delta by feeding the villages and population data to the software and it populates clusters using probability proportional to size (PPS) sampling approach.

C.2. Second stage sampling

Second stage sampling (household selection) utilized modified EPI-method as recommended by SMART methodology and as well considering the design of the camp and availability of sampling information from the UNHCR Progress Database. In the randomly selected clusters the survey team contacted the village (Boma – Small administrative unit in the camp) leaders who helped to identify village boundaries, segmentation and locating the centre of the village.

In all selected households, all children from 6-59 month were included in the anthropometric. In the final household, all children regardless of the required number of children needed per cluster were included. If there were no children in the household, the house remained as part of the sample that contributed zero children to the anthropometric survey but mortality, WASH and FSL data was collected.

All children in the age range of 0 – <6 months were included in the IYCF component. The age of the children was determined mainly using a local calendar of events and in some cases birth record when available.

D. Data Collection and Field Work

Six survey teams each comprising of 1 team leader, 1 enumerator and 2 measurers were involved in the integrated nutrition and retrospective mortality survey. The teams were trained for 4 days on anthropometric measurement, survey methodology, interview skill and other practical aspects. A standardization test was also conducted to evaluate the capacity of enumerators and pilot test was done which helped the team to practice the measurement and get familiarized with the survey tools. Survey team members who failed standardization test underwent more training to boost their skills. Additionally each team was having an ACF supervisor for quality assurance on field coaching.

D.1. Anthropometric survey

Anthropometric data was collected from all children in the selected HHs within the eligible age range (6-59 months) using anthropometric questionnaire. The data that was collected include:

Age: Recorded with the help of local calendar of events

Sex: Male or female

Weight: Targeted children were weighed without clothes using SALTER scale of 25kg (100g precision)

Height: Children were measured on a measuring board (precision of 0.1 cm). Children less than 85 cm were measured lying down, while those greater than or equal to 85 cm were measured standing up.

Mid-upper arm circumference: MUAC was measured at the mid-point of the left upper arm for measured children (precision of 0.1 cm).

Bilateral edema: Assessed by the application of normal thumb pressure for at least 3 seconds to both feet.

Household status: it was determined by the household members themselves

All the team members were given a referral format and all children found severely acutely malnourished were referred to OTP sites while those moderately acutely malnourished were referred to SFP centers.

D.2. Retrospective Mortality survey

Mortality data was collected from all 13 households per cluster regardless of eligible children for anthropometric component of the survey. Ninety days recall period was used to collect the data using the beginning of December as reference point. Standard mortality questionnaire was used to collect the data.

D.3. Contextual information collected

Food security and livelihoods, water, sanitation and hygiene and IYCF data was collected from the same population that mortality and anthropometric data were collected to complement the findings. A pre-structured questionnaire was used to collect these data.

D.4. Qualitative Data

Qualitative data was collected via a pre-structured questionnaire. It was collected from the same community where anthropometric and mortality data was collected, the groups were stratified to have males and females separately and cross referencing with other villages. In addition, we conducted key informant interviews with Camp Administrator, Nutrition and WASH personnel in Samaritan Purse, Medical Coordinator and WASH personnel in MSFF and IRC field Coordinator.

E. Data Quality Control and Assurance

The high quality of the training coupled with standardization test, practical field exercise and close supportive supervision from the supervisors ensured the quality of the data collected from the field was good. The enumerators who failed standardization test underwent more training to perfect their skills

F. Field Exercise

One day ahead of actual data collection, a field exercise was conducted in a village that was not selected for the survey. It gave an opportunity for all team members to practice measurement techniques and to familiarize with the tools. Feedback was given based on the gaps observed.

G. Data Entry and Analysis

ENA for SMART software June 20th, 2011 version was used to enter and analyze anthropometric and mortality data. Data with extreme values identified by the software were excluded from analysis using

SMART flags. Data entry for WASH, IYCF and FSL was done using EPI info 3.5 versions and analysis done in SPSS version 16.

H. Challenges

The age determination was a major challenge as many mothers/caregivers did not know the birth dates of their children. Ages were thus approximated by the use of a local calendar of events developed.

I. Guidelines and Formulas used

I.1. Acute Malnutrition

Weight for Height Index: Weight for height index was used to identify wasted children. It measures short term effect either from lack of food intake or illness, which reflects the recent past and current situation of the area. It is useful particularly when it becomes difficult to determine the exact age of the child as the case in most rural parts of developing countries.

Acute malnutrition rate was estimated using weight for height index and bilateral pitting edema. Results are expressed both in z-score and percentage of median using NCHS reference and WHO standards.

The following guidelines were thus used in expression of results in z-score and percentage of median

Thresholds for results expressed in Z-score
SAM is defined by WFH <-3SD and/or existing bilateral pitting edema
MAM is defined by WFH <-2SD and >=-3 SD and no edema
GAM is defined by <-2 SD and/or existing of bilateral pitting edema

Thresholds for results expressed in percentage of median
SAM is defined by WFH < 70% and/or existing bilateral edema
MAM is defined by WFH > 70% and >= 80% and no pitting edema
GAM is defined by < 80% and/or existing of bilateral pitting edema

Mid-Upper Arm Circumference: MUAC is a good indicator of muscle mass and can be used as a proxy of wasting. It is also a very good predictor of the risk of death. MUAC is mainly measured on children aged 6 to 59 months. MUAC is a good predictor of the risk of death in 6-59 month old children, because of its relationship with the muscle mass. It is therefore a very successful screening tool that rapidly identifies children likely to die unless provided with nutritional and medical treatment. MUAC is mainly used for detecting individuals in need of treatment rather than for measuring population trend data.

In children 6-59 month old, MUAC < 115 mm is recommended as a criterion of admission to therapeutic feeding programs. It is particularly recommended for the detection of severe malnourished 6-59 month-old children at community-level. MUAC is also used to detect moderately malnourished children and as a criterion of admission to supplementary feeding centers.

Table 3: MUAC Thresholds

MUAC Guideline	Interpretation
MUAC < 115mm and/or bilateral pitting edema	SAM with high risk of mortality
MUACH ≥ 115mm and < 125mm	MAM with risk of mortality
MUAC ≥ 125mm and < 135mm	Risk of malnutrition
MUAC ≥ 135mm	Adequate nutritional status

I.2. Retrospective Mortality

Ninety days recall period was used to collect mortality data. SMART methodology was utilized in data entry and calculation of crude and under five mortality rates. The result is expressed per 10,000 people per day. It is calculated using the following formula.

$$\text{Crude Mortality Rate (CMR)} = 10,000 / a * f / (b + f / 2 - e / 2 + d / 2 - c / 2)$$

Where:

- a = Number of recall days (100)
- b = Number of current household residents
- c = Number of people who joined household
- d = Number of people who left household
- e = Number of births during recall
- f = Number of deaths during recall period

Thresholds are defined as follows⁴

Crude Mortality Rate (CMR):

- Alert level: 1/10,000 persons/day
- Emergency level: 2/10,000 persons/day

Under five Mortality Rate (U5MR):

- Alert level: 2/10,000 persons/day
- Emergency level: 4/10,000 persons/day

⁴Health and nutrition information systems among refugee and displaced persons workshop report on refugee's nutrition ACC/SCN, November 2003

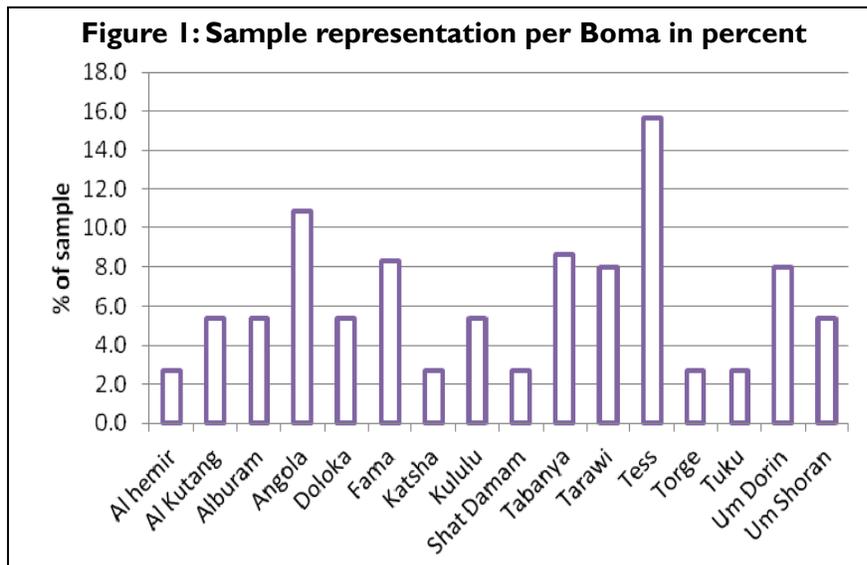
SECTION V

RESULTS

A. General Population Sample Demographics

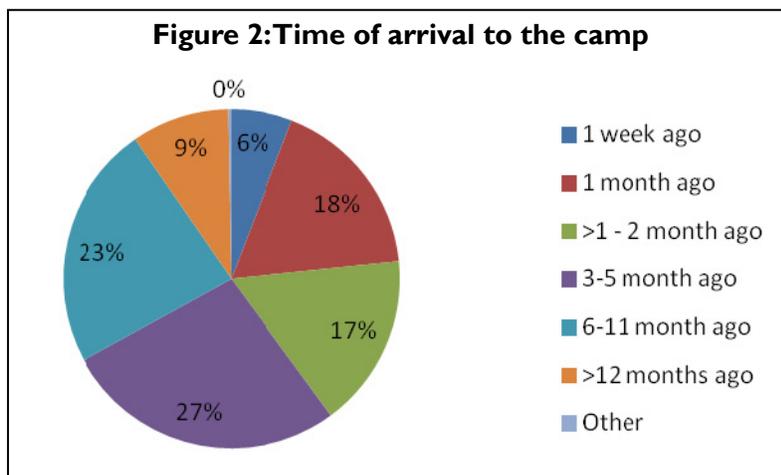
A.1. Sample representation by Boma

The sample representation was computed using the probability proportional to size approach and thus the percentage of the sample is dependent on the size of the Boma. Figure 1 gives a pictorial view of population sample.



A.2. Time of Arrival to the Camp

The survey sought information on the time the refugees have stayed in the camp by asking when they arrived from the place of origin. Figure 2 shows the stay period in the camp for the sampled households.



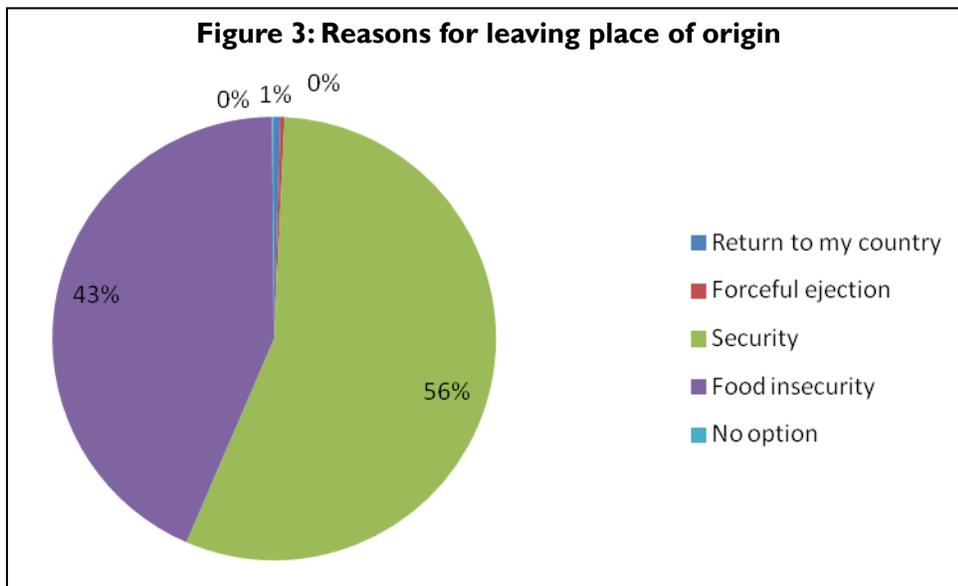
A look at Figure 2 indicates that about 68% of the sampled population arrived in the camp less than 6 months prior to the survey period. Only 9% of the population had stayed for more than 12 months and some 23% staying 6-11 months.

A.3. State and County of Origin

The survey population (99.5%) is mainly from South Kordofan State with 0.2% and 0.3 mentioning Khartoum and North Darfur respectively. Analysis by County of origin shows that much of the population is from Al Buram (63.3%) followed by Kadugli (35.2%); the rest are from Rashad, Tolodi and Abu Jubaiyah accounting for 1.5% of the total sample.

A.4. Travel period and Reasons for leaving place of Origin

The travel period from the place of origin to the camp was between 1 – 6 days depending on the means of transport and distance from Yida. The reasons for leaving the place of origin are as shown in Figure 3.



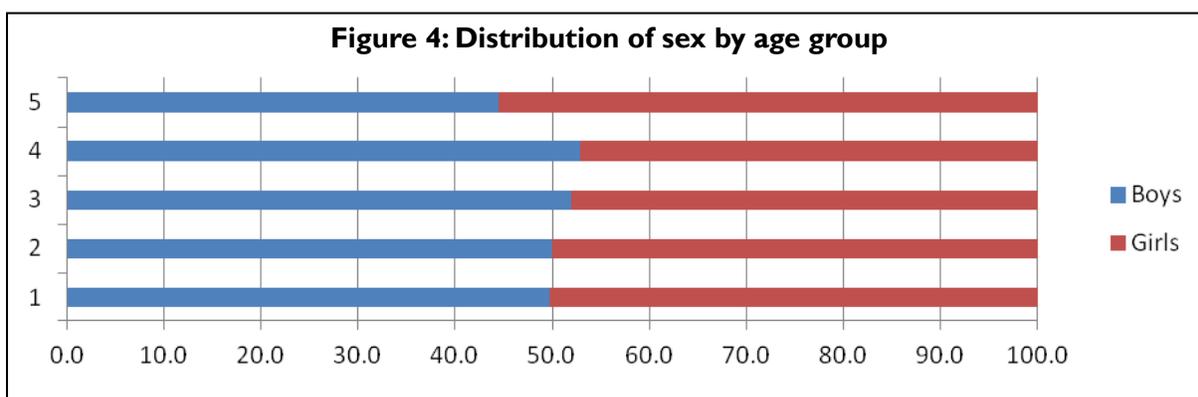
B. Anthropometric Sample Demographics

The distribution of the sample by age and sex for children the sampled population revealed that the overall sex ratio was 1.0, which is expected for a normally distributed populations especially for <5 years. Table 4 below summarizes the age and sex distribution of the surveyed children.

The ratio of boys to girls was in the acceptable range. However, the representation of older age category of the children was lower as compared to the young ones. This is as the result of difficulty for caretakers to give exact age of older children. The distribution of sex by age group ranged between 45% to 53% and lies in the acceptable range for all age groups (Figure 4).

Table 4: Distribution of Age and Sex of Sample

AGE (mo)	Boys		Girls		Total		Ratio
	n	%	n	%	n	%	Boy: girl
6-17	98	49.7	99	50.3	197	22.2	1.0
18-29	129	50.0	129	50.0	258	29.0	1.0
30-41	143	52.0	132	48.0	275	30.9	1.1
42-53	65	52.8	58	47.2	123	13.8	1.1
54-59	16	44.4	20	55.6	36	4.0	0.8
Total	451	50.7	438	49.3	889	100.0	1.0



C. Anthropometric Survey

C.I. Prevalence of acute Malnutrition based on weight-for-height z-scores, WHO Standards

The survey found GAM and SAM rates of 21.9% (17.3 - 27.4 95% C.I.) and 6.1% (4.0 - 9.1 95% C.I.) respectively (Table 5). Global acute malnutrition (GAM) and severe acute malnutrition (SAM) Z-scores were defined as W/H < -2 z and/or nutritional edema and W/H < -3 z and/or nutritional edema, respectively. The prevalence of edema was 0.0 %.

Table 5: Prevalence of acute malnutrition based on WFH z-scores (and/or edema) and by sex

	All n = 889	Boys n = 451	Girls n = 438
Prevalence of global malnutrition (<-2 z-score and/or edema)	(195) 21.9 % (17.3 - 27.4 95% C.I.)	(108) 23.9 % (18.6 - 30.3 95% C.I.)	(87) 19.9 % (15.1 - 25.7 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no edema)	(141) 15.9 % (12.7 - 19.6 95% C.I.)	(82) 18.2 % (14.3 - 22.9 95% C.I.)	(59) 13.5 % (10.1 - 17.7 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or edema)	(54) 6.1 % (4.0 - 9.1 95% C.I.)	(26) 5.8 % (3.4 - 9.6 95% C.I.)	(28) 6.4 % (4.1 - 9.8 95% C.I.)

Table 6: Prevalence of acute malnutrition by age, based on WFH z-scores and/or nutritional edema

Age (mo)	Total no.	Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (>= -2 z score)		Edema	
		No.	%	No.	%	No.	%	No.	%
6-17	197	14	7.1	46	23.4	137	69.5	0	0.0
18-29	258	18	7.0	33	12.8	207	80.2	0	0.0
30-41	275	13	4.7	40	14.5	222	80.7	0	0.0
42-53	123	7	5.7	15	12.2	101	82.1	0	0.0
54-59	36	2	5.6	7	19.4	27	75.0	0	0.0
Total	889	54	6.1	141	15.9	694	78.1	0	0.0

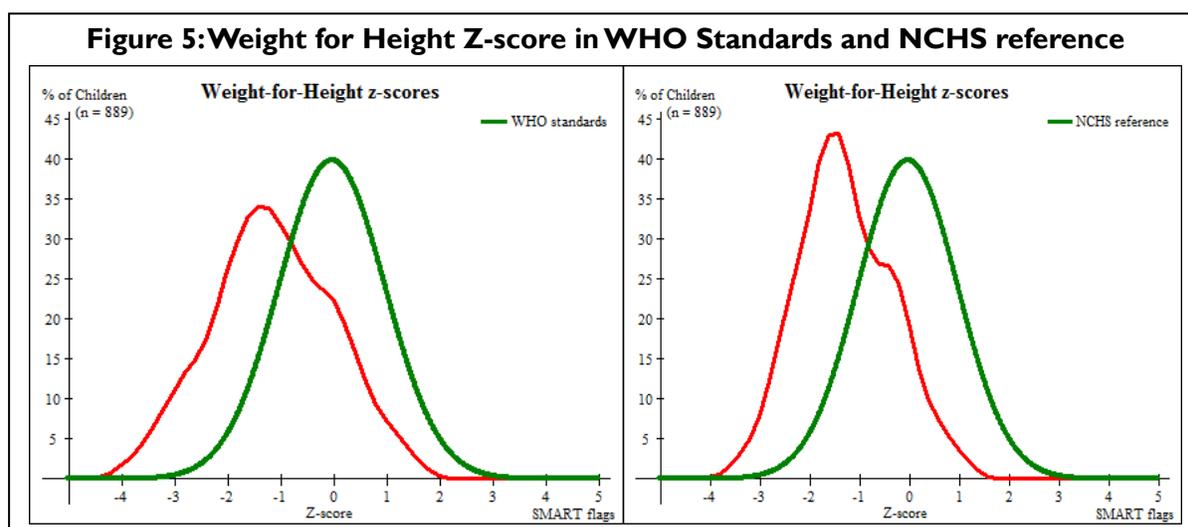
Among the 889 children sampled, none was excluded from analysis using SMART flag. There was no reported case of nutritional edema (0.0%) and children who were found with SAM and MAM during data collection were referred to OTP and SFP respectively (Table 6 and 7).

Table 7: Distribution of acute malnutrition and nutritional edema based on WFH z-scores

	<-3 z-score	>=-3 z-score
Edema present	Marasmic kwashiorkor No.0 (0.0%)	Kwashiorkor No.0 (0.0%)
Edema absent	Marasmic No.54 (6.1%)	Not severely malnourished No.835 (93.9%)

C.2. Weight for Height in Z-score compared to WHO Standard

The Weight-for-height distribution curve of the anthropometric survey results of the survey population compare to WHO standard is presented below (Figure 5). The curve shifted to the left with mean \pm SD of WHZ (n=586) being (-1.13 ± 1.15) , which shows that the surveyed population is normally distributed and that the nutrition status is poor compare to the Standard population. The design effect was 3.18, which shows some intra cluster variations and implies some heterogeneity of the population and pockets of malnutrition distribution within the community sampled.



As shown in Table 8 below, the GAM and SAM rates both for WHO and NCHS reference is well above emergency threshold (15%).

Table 8: Global and Severe Acute Malnutrition in Z-score both in WHO and NCHS

	WHO Standards	NCHS Reference
Global Acute Malnutrition	(195) 21.8 % (17.2 - 27.3 95% C.I.)	(108) 18.4% (15.1 - 22.1 95% C.I.)
Severe Acute Malnutrition	(54) 6.1 % (4.0 - 9.1 95% C.I.)	(9) 1.5% (0.7 - 3.5 95% C.I.)

C.3. Distribution of Acute Malnutrition based on WHZ (and/or nutritional edema), NCHS growth reference 1977

The prevalence of GAM and SAM based on weight for height Z-scores NCHS growth reference 1977 were found to be 18.4% and 1.5% respectively as shown in table 9. The prevalence of edema is 0.2 %

Table 9: Prevalence of acute malnutrition based on WHZ (and/or nutritional edema) and by sex (NCHS reference)

	All n = 588	Boys n = 287	Girls n = 301
Prevalence of global malnutrition (<-2 z-score and/or edema)	(108) 18.4 % (15.1 - 22.1 95% C.I.)	(59) 20.6 % (16.5 - 25.3 95% C.I.)	(49) 16.3 % (11.8 - 22.0 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no edema)	(99) 16.8 % (13.8 - 20.4 95% C.I.)	(53) 18.5 % (14.5 - 23.2 95% C.I.)	(46) 15.3 % (10.9 - 21.0 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or edema)	(9) 1.5 % (0.7 - 3.5 95% C.I.)	(6) 2.1 % (0.8 - 5.2 95% C.I.)	(3) 1.0 % (0.3 - 3.1 95% C.I.)

C.4. Prevalence of Acute Malnutrition based on MUAC

Table 10: Prevalence of acute malnutrition based on MUAC (and/or nutritional edema) and by sex

	All n = 889	Boys n = 451	Girls n = 438
Prevalence of global malnutrition (< 125 mm and/or edema)	(128) 14.4 % (11.4 - 18.0 95% C.I.)	(56) 12.4 % (9.3 - 16.3 95% C.I.)	(72) 16.4 % (12.4 - 21.5 95% C.I.)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no edema)	(100) 11.2 % (8.9 - 14.2 95% C.I.)	(47) 10.4 % (7.3 - 14.6 95% C.I.)	(53) 12.1 % (9.2 - 15.7 95% C.I.)
Prevalence of severe malnutrition (< 115 mm and/or edema)	(28) 3.1 % (1.9 - 5.3 95% C.I.)	(9) 2.0 % (0.9 - 4.4 95% C.I.)	(19) 4.3 % (2.3 - 8.0 95% C.I.)

C.5. Prevalence of acute malnutrition by age, based on MUAC cut off's and/or edema

Table 11: Prevalence of acute malnutrition based on MUAC (and/or nutritional edema) and by age groups

Age (mo)	Total no.	Severe wasting (< 115 mm)		Moderate wasting (>= 115 and < 125 mm)		Normal (> = 125 mm)		Edema	
		No.	%	No.	%	No.	%	No.	%
6-17	197	13	6.6	37	18.8	147	74.6	0	0.0
18-29	258	6	2.3	39	15.1	213	82.6	0	0.0
30-41	275	8	2.9	21	7.6	246	89.5	0	0.0
42-53	123	1	0.8	2	1.6	120	97.6	0	0.0
54-59	36	0	0.0	1	2.8	35	97.2	0	0.0
Total	889	28	3.1	100	11.2	761	85.6	0	0.0

C.6. Nutrition status disaggregated by arrival time in the camp*

Table 12: Nutrition status disaggregated by arrival time in the camp

Nutrition status	1 week ago	1 month ago	>1-2 month ago	3-5 month ago	6-11 month ago	>12 months ago	Other specify	Total
Normal	23	69	54	89	120	39	1	395
At risk	19	46	60	79	76	19	1	300
MAM	3	40	25	34	28	10	0	140
SAM	3	14	11	15	10	1	0	54
Total	48	169	150	217	234	69	2	889

*It is worth to note that the rates given above are proportions rather than acute malnutrition rates and as well to give a glimpse of the distribution taking into account how long the households had stayed in the camp.

D. Retrospective Mortality Survey

Mortality data was collected in every household visited, Ninety days recall period was used to collect retrospective mortality data using the Easter period as a reference point. Data was collected from 18 households per cluster and summary of the result is presented in table 13. Crude and under five mortality rate were found to be 0.76 [0.47 – 1.23] and 2.15 [1.31 –

Table 13: Crude and Under Five Mortality data

Demographic Data	Number
Current resident at household	3997
Current resident under five in household	1002
People who joined the household	539
Under five who joined the household	192
People who left the household during recall period	203
Under five children who left the household during recall period	78
Birth	45
Death	26
Under five death	18
Recall period in days	90
CMR [Death/10,000 people/day]	0.76 [0.47 – 1.23 95% C.I.]
U5MR [death in under five children/10,000/day]	2.15 [1.31 – 3.50 95% C.I.]

3.50] respectively, which is below the cut-off points for emergency 2/10,000/day for CMR and 4/10,000/day for U5MR.

E. Morbidity, Measles and vitamin A coverage

The assessment also wanted to evaluate the coverage of Vitamin A and Measles in the surveyed population. The results at the time of the survey showed that of the 907 children, only 21.6% received the Vitamin A capsule and 80.3% received measles vaccination as shown by the EPI card and further 6.2% by recall.

The survey investigated enquired on child sickness in the last two weeks prior to the survey date. Three quarters (74.5%) reported having fallen sick. Common illnesses were reported are shown in Figure 7 below.

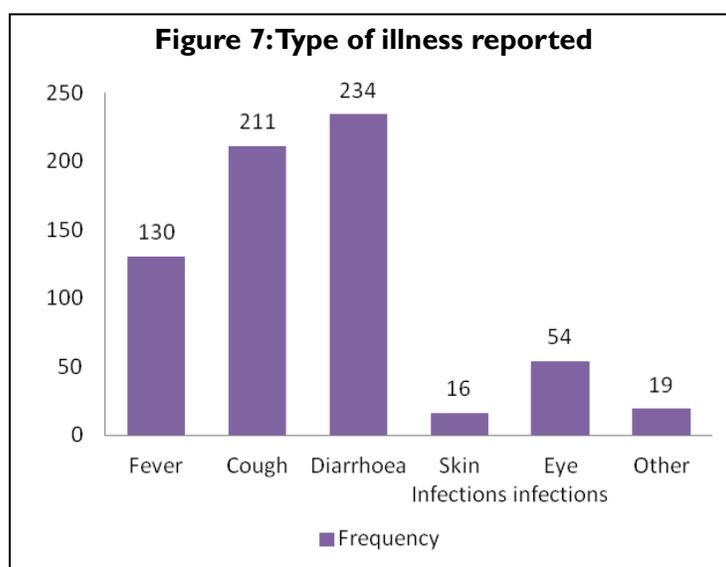
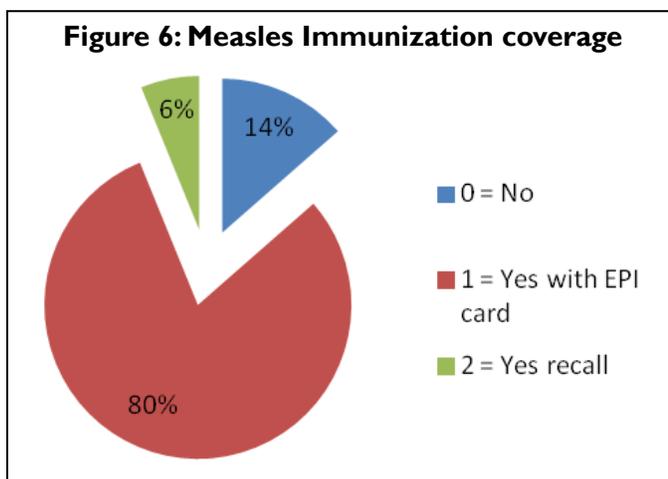


Table 14: Treatment sought

Treatment Sought	Frequency	Percent
0 = None sought	322	38.2
1 = Hospital	0	0.0
2 = PHCC/PHCU	518	61.5
3 = Mobile /outreach clinic	1	0.1
4 = Village health care worker	0	0.0
5 = Private physician	0	0.0
6 = Relative/ friend	0	0.0
7 = Shop	0	0.0
8 = Traditional practitioner	1	0.1
9 = Pharmacy	0	0.0
Total	842	100

Health seeking behavior was also explored by asking the treatment the respondent sought when the child was ill and responses were as shown in table 14.

Use of mosquito net was reported in 39.1% of the households.

F. Food Security and Livelihood

The average household size for the population in Yida camp is 6.37 and the ratio of household heads by gender was almost 1:1 since male headed households accounted for 53.8% and female headed households for 46.2%.

The main source of food for the population is food distribution by WFP and was reported by 99% of the surveyed population. The commodities distributed include cereals (maize or sorghum), pulses, oil and salt and the quantities are based on SPHERE standards. Shown below is a distribution plan for April 2012, Source WFP.

Table 15: Humanitarian assistance plan for April 2012 (WFP)

Location	MOD	RAT	Total Beneficiaries	CER	PUL	OIL	SALT	SUG	CSB+	CSB++	SPLY	PDZ	HEB	Total MT
Nyiel	GFD	SPHERE	723	10.85	1.10	0.66	0.10	-	-	-	-	-	-	12.71
Nyiel Total			723	10.85	1.10	0.66	0.10							
Yida Refugees Camp	BSF	BSFP	1575	-	-	-	-	-	-	-	-	2.17	-	2.17
	GFD	SPHERE	27442	374.80	37.45	22.46	3.74	-	-	-	-	-	-	438.46
	TSFP	MAM	3887	-	-	0.30	-	0.30	3.00	-	-	-	1.32	4.92
PLW		900	10.80	-	0.80	-	0.55	-	-	-	-	-	12.15	
Yida Refugees Camp Total			33,804	385.60	37.45	23.56	3.74	0.85	3.00	-	-	2.17	1.32	457.70
April Distributions Total			34527	396.45	38.55	24.22	3.84	0.85	3.00	-	-	2.17	1.32	470.41

The survey also cross referenced on the commodities received and from the results, most households (over 99%) are receiving cereals, pulses, oil and salt from general food distribution. A few of the households that are registered in BSFP or TSFP reported receiving sugar.

F.1. Food Consumption Score (FCS)

The FCS is a composite score based on dietary diversity, food frequency, and relative nutritional importance of different food groups. The information is collected from a specific list of food groups. The interviewed household was asked about frequency of consumption (in days) over a recall period of the past 7 days. Food items are grouped into 8 standard food groups with a maximum consumption frequency score of 7 days/week.

The frequency score of each food group is multiplied by an assigned weight that is based on its nutrient content. Those values are then summed obtaining the Food Consumption Score (FCS).

$$FCS = x_{staple} a_{staple} + x_{pulses} a_{pulses} + x_{vegetable} a_{vegetable} + x_{fruit} a_{fruit} + x_{animal} a_{animal} + x_{sugar} a_{sugar} + x_{dairy} a_{dairy} + x_{oil} a_{oil}$$

Where:

FCS = Food consumption score

x_i = Frequencies of food consumption = number of days for which each food group was consumed during the past 7 days (7 days was designated as the maximum value of the sum of the frequencies of the different food items belonging to the same food group)

a_i = Weight of each food group

Table 16: Food consumption score weighting

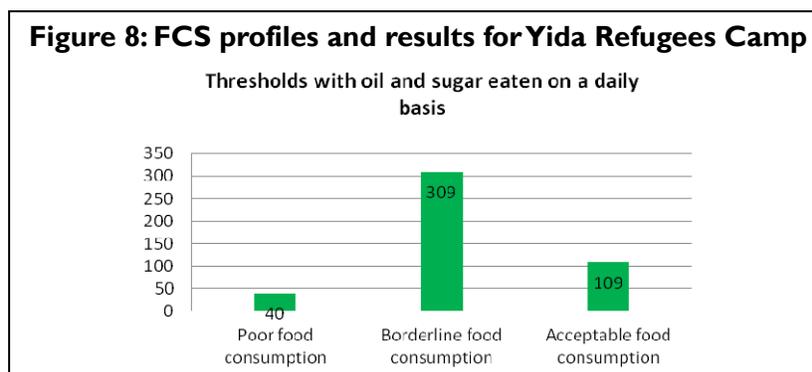
Food Items	Food groups	Weight
Maize/ sorghum/ millet/ pasta/ bread/ rice/ other cereals	Cereals and Tubers	2
cassava/ potatoes/ sweet potatoes/other tubers		
beans/ lentils/ groundnuts/ cashew nuts/ sesame/ peas	Pulses	3
Vegetables/ green leaves	Vegetables	1
Fruits	Fruit	1
Beef, goat, pork, poultry, eggs, fish	Meat and Fish	4
Milk and other dairy products (yoghurt, curd)	Milk	4
Sugar and sugar products, honey	Sugar	0.5
Fats, butter	Oil	0.5

Since most of the population consumes oil and sugar on a daily basis it therefore appropriate to use the threshold that takes into account daily consumption of oil and sugar.

The thresholds applied are shown in the Table below:

Table 17: FCS Thresholds

Threshold	Profiles	Thresholds with oil and sugar eaten on a daily basis
0 - 21	Poor food consumption	0 - 28
21.5 - 35	Borderline food consumption	28.5 - 42
>35	Acceptable food consumption	> 42



The survey population results (Figure 8 on the previous page) indicate the prevalence of households with poor food consumption is low and the majority of households have borderline food consumption due to dependence on food aid.

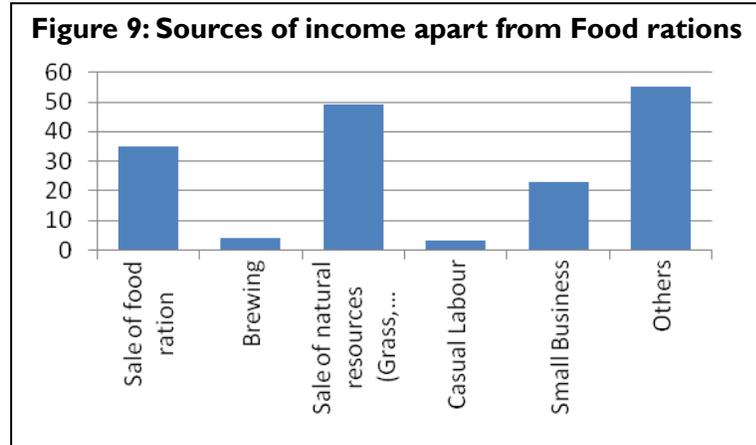
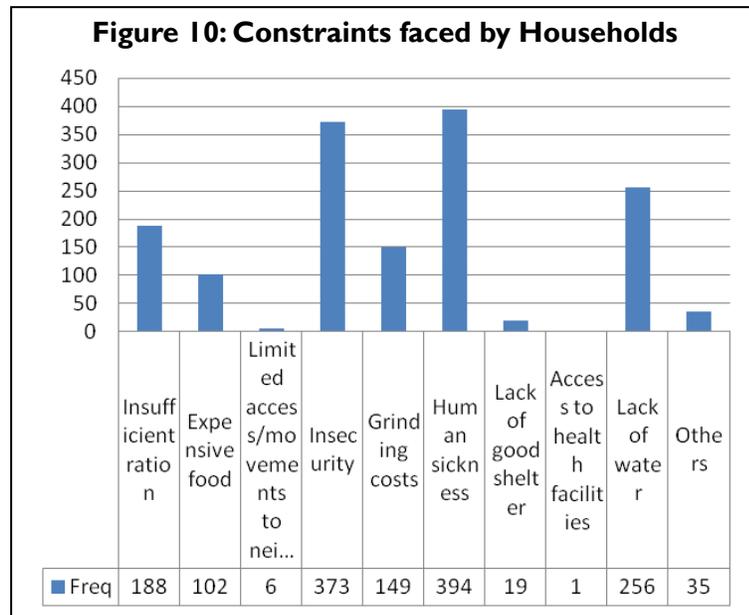


Figure 9 shows the sources of income for the 169 households (25.5%) that mentioned other forms of income apart from the WFP food basket distributed every month.

The main coping mechanisms used by the households in times when there is not enough food in the households are: relying on less preferred foods, borrowing, limiting portion size at meals and reducing number of daily meals, the results are shown in table below.

Table 18: Households Coping Mechanisms

Coping Mechanisms n=516	Frequency	Percent
Rely on less preferred/ cheaper food	54	28.6
Borrowing/ kinship support	60	31.7
Limit portion size at meals	25	13.2
Restrict adults' consumption for children	1	0.5
Purchase food on credit	17	9.0
Reduce number of daily meals	3	1.6
Send HH members to eat elsewhere	9	4.8



The community also faces a number of constraints, according to the survey. Figure 9 shows a number of constraints the community is coping with. As you will observe the major constraints are human sickness, insecurity, lack of water, insufficient ration and grinding costs. The observed constraints clearly collaborate the findings in morbidity, water access and food access.

G. Infant and Young Child Care practices

G.1. Timely initiation of breastfeeding

Respondents were asked whether their children were ever breastfed. 96.5% of children of 0 - 23 months were breastfed. Moreover 65.0% of the children had reportedly been initiated to breastfeeding within the WHO recommended 1 hour while 24.8% initiating within the day and 3.5% initiating after the first day and finally 6.7% after 48hrs.

G.2. Other breastfeeding practices

Every child surveyed, the respondents overwhelmingly reported 88.2% having received colostrum and 93.3% of the children sampled were still being breastfed at 1 year.

G.3. Exclusive breastfeeding

Exclusive breastfeeding rates were analyzed for infants below 6 months. Although all children below 6 months of age were reportedly still breastfeeding, in the first three days of life, 39.5% were fed on food other than breast milk and further 67.6% of them were already on other foods. This shows that these children have been weaned at an early age (1 - 5months), implying that only 26.2% of the infants were exclusively breastfed as per the WHO recommendation.

G.4. Minimum individual dietary diversity of complementary foods

The dietary diversity indicator is based on the premise that the more diverse the diets are the more likely they are to provide adequate levels of nutrients. There is considerable evidence for this⁵. For this indicator, each of the groups is scored “1” if the child has consumed the food group yesterday, and “0” if not. This results in a diversity score ranging from 0 to 7 for each child. Higher scores correspond to a more adequate range of food groups in the diet.

The minimum individual dietary diversity was analyzed for children 6-23 months of age.

Table 19: Frequency of feeding

Frequency of Feeding		
No of times eaten per day	Frequency	Percent
1	31	13.0
2	69	29.0
3	109	45.8
4	24	10.1
5	5	2.1

⁵ Ruel M. T. (2002): Is dietary diversity an indicator of poor food security or diversity quality? A review of measurement issues and research needs. Food Consumption and Nutrition Division, International Food Policy Research Institute (IFPRI), FCND Discussion Paper No. 140

Table 20: Food groups eaten and frequency per day

Food Groups Eaten, Sample wide		
Food Groups Eaten, n = 365	Frequency	Percent
0 = None/ Only breast milk	97	26.6
1 = Cereals	205	76.5
2 = Legumes/ nuts	14	5.2
3 = Roots and tubers	2	0.7
4 = Meat / poultry / offal	20	7.5
6 = Milk and milk products	10	3.7
7 = Vegetables	15	5.6
8 = Fruits	0	0.0
9 = Eggs	0	0.0
10 = Oil / fats	2	0.7

The consumption of different food groups by children in all the households fall on the Low dietary diversity: (≤ 3 food groups). The main food groups eaten are cereals (76.5%), Meat/poultry/offal (7.5%) and legume/nuts (5.2%) (Table 20).

A cross tabulation of the food groups and frequency of feeding clear depicts a negligible percent met the required minimum acceptable diet of four food groups and 2 – 4 times meal frequency per day (Table 21).

Table 21: Food groups and Meal Frequency

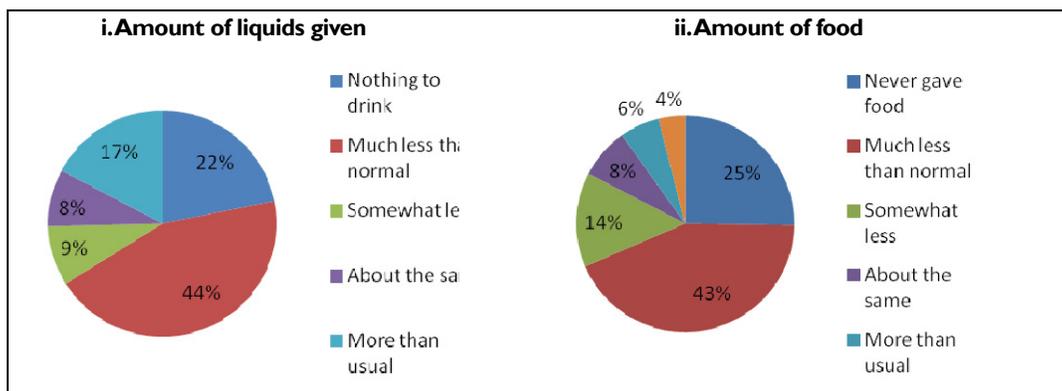
Food groups eaten per day	Frequency of feeding per day					
	1	2	3	4	5	Total
1	19	48	78	20	3	168
2	5	10	16	1	0	32
3	0	5	3	0	0	8

G.5. Management During diarrheal incidence

Diarrhea is an important cause of under nutrition. This is because nutrient requirements are increased during diarrhea, just like during other infectious diseases, because nutrient intake and absorption are usually decreased. Each episode of diarrhea can cause weight loss and growth faltering. Moreover, if diarrhea occurs frequently, there may be too little time to "catch up" on growth between episodes. In general, the impact of diarrhea on nutrition status is proportional to the number of days a child spends with diarrhea each year.

As discussed above, the feeding of children in these communities especially in the incidence of diarrhea is below the recommended standard and contributes to increased cases of severe malnutrition and in some cases leads to death. Chart 4 below presents the picture of how the situation is in the survey community. It is required that feeding during diarrhea incidence should be more than normal to replace the loss of fluid leading to dehydration. Therefore a child is expected to be given more fluids than usual to prevent dehydration and plenty of nutritious food, to prevent malnutrition. From the chart you may notice that only 14% were able to feed the children more than usual.

Figure 11: Feeding during diarrhea incidence



H. Water, sanitation and Hygiene

Water is essential for life and is a priority for vulnerable communities such as Yida camp. In addition, water and sanitation issues are part of the underlying causes of malnutrition as presented in the malnutrition conceptual framework⁶.

H.1. Water Access

Survey results show that 88.3% of the community used improved water source for drinking⁷, way above the sub-Saharan average which is 60%⁸. This serves as a proxy indicator for whether a household's drinking-water is safe or not. The water sources are mainly constructed and maintained by Samaritan Purse and the whole camp gets water from the provided points. The mechanized boreholes and water is being pumped to storage tank (bladder) then piped to a point where the community can access, using a number of taps; In the camp population sampled only, 9.3% percent of the population travels less than 30 minute to access water and 13.7% take half to one hour, from either source (Table 22). Women are usually the people to fetch water for the household; this is mainly dictated by culture.

Table 22: Water sources and time taken to fetch it

HH water source	Frequency	Percent
Borehole	553	88.3
Dam/Pond	73	11.7
Total	626	100
Time taken to fetch water	Frequency	Percent
<30 minutes	58	9.3
>30min to <1hr	86	13.7
>1hr to <2hr	200	31.9
>2hr to <4hr	215	34.3
<4hr	67	10.7
Total	626	100.0%

⁶ Water Sanitation and Hygiene Policy ACF-IN

⁷ Explained in the executive summary section

⁸ UNICEF/WHO Joint Monitoring Report March 2010: Progress on Sanitation and Drinking Water.

H.2. Water Treatment

Majority of the population (96.6%) do nothing to the water collected either from improved or unimproved sources at household level. This shows that water treatment practices at the household level are very low, which seems to indicate the consumption of unsafe water especially critical for the population that access stagnant surface waters. Only 0.5 % boils drinking water, 2.1% let the water settle and 0.8% used water filtration method for water treatment.

H.3. Sanitation and Hygiene

A considerable proportion of the sampled camp population (53.7%) use unimproved sanitary facilities (designated and undesignated bush area)⁹ and 44.6% use latrines. The context of YIDA camp is quite different to the ordinary community and thus the results interpretation should take cognizance of the context.

Among the surveyed households, 73.6% wash their hands before eating, 65.8% wash their hands before cooking, 16.7% after defecation and. In addition, only 35.3% wash hands before breastfeeding a child, 48.4% after defecating, and 20.6% after cleaning child feces. Only 44.1% of household reported using soap at home when washing their hands. Only 4.5% of the surveyed household use ash for hand washing. This highlights poor hygiene behaviors among the population (Table 23).

Sanitation and hygiene are critical to health, survival, and development. Lack of basic sanitation facilities coupled with the poor hygiene practices and lack of access to improved drinking water sources makes the communities vulnerable to diseases.

Table 23: Material used for Hand washing

What is used In hand washing?	Frequency	Percent
Nothing	6	1.0
Water only	314	50.5
Water + soap	274	44.1
Water + ash	28	4.5
Total	513	100.0%

⁹ Core questions on drinking water and sanitation for HH survey, WHO and UNICEF 2006, used for the definition of improved and unimproved sanitary facility

SECTION VI

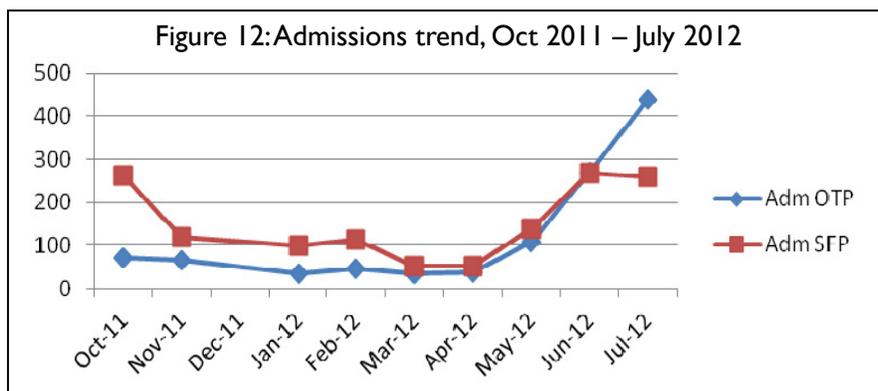
DISCUSSION

Yida refugees' camp situation has to be understood in the sense that it has a cocktail of confounding factors that has put pressure not only on the refugees' population but as well in the humanitarian sector within the camp. The first thing that strikes is the fact that the camp is situated just at the border with both UNHCR and the camp administration not agreeing on the camp location. UNHCR is pushing for the camp to move to Nyiel, however, the camp population is staying put arguing that Nyiel is not habitable and cannot sustain the camp population. Apart from that, the camp is currently cut out from the main hub where most of its supplies are fetched. Despite the challenges with the ground movements, the air movements to and from the camp are also challenging with 2 UNHAS flights per week which is mainly used for personnel movements.

A. Nutrition status

The results of the nutritional status of children in Yida camp were far higher than the emergency thresholds of the WHO 2006 standard. These figures were among few counties in South Sudan with very high rate of acute malnutrition with GAM and SAM levels of >20% and 5%, respectively.

The admission trends of new arrivals to the Samaritan Purse therapeutic programs has shot up, an indication of worsening nutrition situation in the camp given the fact that new arrivals seem to be more affected as they get to the camp exhausted, weak and even malnourished and with high influx (about 300-500/day), then more cases are expected to be admitted to nutrition treatment programs. The graph below from Samaritan Purse new arrivals admission trends vividly shows the increasing numbers in the last few weeks. The reduction of admission in the SFP during the last month may not represent the actual condition as it could be due to SFP supplies shortage.



Low dietary diversity, dependency on food rations and food consumption score as reported here underscore the trend of food insecurity in the survey area. Most of the households lack diversity in their diet and FCS for most households was in the borderline or poor as only 23.8% were in the acceptable food consumption profile.

B. Breastfeeding Practices

Breastfeeding practices were adequate and this is in reference to initiation of breastfeeding which was universal as breastfeeding is the cultural norm, giving of colostrum and duration of breastfeeding. It is

recommended that all children be breastfed for two years or longer because of the immense health benefits of breast milk. The majority of the children 0-23 months old in all the survey sites were still being breastfed. Most of the children were given colostrum which provides antibodies thus conferring immunity to the baby.

In contrast, optimal breastfeeding practices in terms of not giving of pre-lacteal feeds, and exclusive breastfeeding for 6 months were inadequate. A question on pre-lacteal revealed that almost 40% of the children were given other fluids other than breast milk. The rationale as found from focus group discussions was that, the mother was not able to produce milk and also kind of traditional practice that they give a child some fermented porridge.

Exclusive breastfeeding rates are very low. The argument given by the FGD respondents was that due to less milk in the mother a child is introduced other foods early and at some point the child is sent away to the grandmother or basically stopped from breast early. The other issue that arose in the FGD was that mostly mothers gets pregnant before the child reaches 6 months and hence unable able to continue exclusive breast feeding. This is an influence of the reproductive pattern of the camp population that also seems to be dictated by the fact that a good percent are Muslims and do not therefore ascribe to the fact of child spacing or basically family planning. While interpreting the prevalence of exclusive breastfeeding, it should be taken into account that the rates are based on a 24-hour recall cross-sectional data which tends to inflate the rates since mothers' infant feeding practices fluctuate from day to day. Cumulative rates of exclusive breastfeeding have been demonstrated to be lower than those from cross-sectional data^{10,11}.

C. Complementary Feeding Practices

The complimentary feeding practices in Yida refugees are below the acceptable standards. The results section clearly depicts inadequate feeding as most children are fed on cereal based diets as the result of limited availability and access to different food groups. The main source of food and in that case livelihood is food rations which are largely cereals. This imply that for majority of the children, the meals did not have an adequate range of food groups and were thus likely to be limited in the diversity of nutrients received. Further the frequency was low, mainly 1-2 meals a day and a negligible percent met the required minimum acceptable diet of four food groups and 2 - 4 times meal frequency per day depending on whether the child is breastfeeding or not.

Continued breastfeeding beyond six months should be accompanied by consumption of nutritionally adequate, safe and appropriate complementary foods that help meet nutritional requirements when breast milk is no longer sufficient. From 6-12 months, breastfeeding - if implemented optimally - should continue to provide half or more of the child's nutritional needs, and from 12-24 months, at least one-third of their nutritional needs. In addition to nutrition, breastfeeding continues to provide protection to the child against many illnesses and provides closeness and contact that helps psychological development. Appropriate complementary foods can be readily consumed and digested by the young child from six months onwards and provides nutrients - energy, protein, fat and vitamins and minerals - to help meet the growing child's needs in addition to breast milk.

¹⁰ Bland RM, Little KE, Coovadia HM, Coutsoydis A, Rollins NC, Newel M. Intervention to promote exclusive breastfeeding for the first 6 months of life in a high HIV prevalence area. *AIDS* 2008; 22: 883-891.

¹¹ Engebretsen SMI, Wamani H, Karamangi C, Semiyanga N, Tumwine J, Tylleskar T. Low adherence to exclusive breastfeeding in Eastern Uganda: A community-based cross-sectional study comparing dietary recall since birth with 24 hour recall. *BMC Pediatrics* 2007; 7(10):1-12.

Low-quality complementary foods combined with inappropriate feeding practices put children from 6 to 23 months in the camp at high risk for under nutrition and its associated outcomes. Too often, solid, semi-solid and soft foods are introduced too soon or too late. The frequency and amount of food offered may be less than required for normal child growth, or their consistency or nutrient density may be inappropriate in relation to the child's needs. Too much of a poor complementary food could displace the more nutritive breast milk in the child's diet. As a whole, the complementary feeding practices in all the survey sites were inadequate.

D. Household Food Security

The food security in the camp is mainly dependent on food rations from WFP. The camp population heavily gets their daily food needs from the rations given per month. The food items are cereals, pulses, oil and salt and the quantities given are as per the SPHERE standards for refugee populations. These clearly indicate the challenges the camp population is facing with issues of diversity and quantities throughout the month. Another confounding factor to the already strained situation is the milling costs as many households would prefer to grind the cereals to make it consumable for the children as well. According to the FGD participants, most of households consume the rations in 2-3 weeks therefore implying that the last week before the next distribution most households are completely exhausted their food reserves and only results to dire coping mechanisms that include eating of bitter wild foods. The most common wild foods taken include:



Wild potatoes (*afe* – *Angula*) poisonous, requires to be soaked for 3 days and washed thoroughly to reduce bitterness and harmful poisonous substance. If eaten raw, it can kill especially children.

Some bulb like wild food is also eaten – the smell can cause vomit, it has to be washed with leaves from some other tree to reduce the smell.

The quality of food with its nutrients, variety of foods and food safety, is a major

determinant of nutritional status in children under 5 years. In the surveyed camp population food diversity is still a challenge since the camp population is strained by a number of confounding factors. The household income is almost non-existent and not diversified, and thus gives limited options to adhere to the nutrition requirement of more than four meals in a day especially for children 6-23 months.

E. Water, Sanitation and Hygiene

The camp population of Yida refugees suffers from a cocktail of causes that contribute to nutritional and morbidity status in children and the camp population at large. Poor Water, sanitation and hygiene practices are evidently assumed to have significant contribution to this.

The number of boreholes for the camp population is not enough (6 boreholes for 60,000 people). Time taken to fetch water has a significant impact on the caretakers' opportunity to engage in additional economic activities (such as small business, collection of thatching materials etc) and decreases the amount of time spent with young children. The safety of water is quite fine as most of the camp population has access to a borehole which is considered safe. Some of the boreholes are chlorinated and the agencies are targeting to chlorinate all the operational boreholes. This indicator is used to measure

the achievement of the Millennium Development Goal related to drinking water supply. As mentioned earlier, 11.7% of the population representing 6,500 individuals access surface water; this therefore shows a health concern in safety of the water especially during the rainy season. This therefore implies there is still need for assistance to the populace in provision of safe water. The challenge in regards to water supply is mainly on the number of people per borehole which puts pressure on the camp population and as well results to long waiting times in the water points as well as creating conflicts. As observed, most households take more than an hour to fetch water. Only 9.3% of the population is able to take less than 30 minutes to get water as recommended by SPHERE standards. However, it is worth noting that the duration is per trip and thus in scenario where households have more than one trip then the time spent per day will either double or triple which therefore compounds the situation further.

Lack of safe sanitation facilities in Yida refugees' camp population is a public health and sanitation concern. Sensitization of communities on improved defecation practices, importance of the use of latrines and proper human waste disposal is critical to achieving a long term improvement in malnutrition. This must be coupled with intensive hygiene education aimed at improving hygiene practices. As the water treatment practices of the camp population at the household level were found to be very low, it could contribute for significant morbidity associated with diarrhea. Chlorination of the water point is of importance and encouraging safe drinking water practices may have profound effect when more population access stagnant surface water.

SECTION VII

RECOMMENDATIONS

The prevalence of acute malnutrition in Yida refugee camp is high, and far beyond the 15% GAM emergency threshold. The under-five mortality rates (U5MR) is worrying. Of greater concern that exacerbates the situation further is the poor sanitation and hygiene in the camp. The following key actions are recommended with a focus on making an impact in the lives of vulnerable children, women, households and camp population at large:

A. Short term

- Scaling up nutrition interventions in the camp. This can be reached by creating more facility-based and outreach OTP sites to cover most of the camp. This also calls for constant supply of the therapeutic supplies and SFP food commodities and also buffer stocks to deter shortages that may be occasioned by increased admissions. Strengthening treatment programs linkages and referrals among the outreach activities, SFP, OTP, and SC as well as the health partners;
- There is urgent need for improving water access. This can be done, for instance, by mechanizing existing hand pumps, maximizing mechanized pumps by laying more pipes with tap stands or use of storage tanks for stocking water and also by increasing the number of existing boreholes. Decentralization of water points within the camp is highly recommended as the population increases and moves further from the current water points. Moreover, there is need for maintaining good hygiene at all water points;
- There is a huge need for sanitation and hygiene promotion activities in the camp. The camp is currently having few latrines that are at household level. There is, therefore, a need for promoting/supporting construction of more household latrines, distribution of soap and appropriate hygiene and sanitation awareness creation within the camp. Proper disposal of all waste as well as control of the carriers of communicable diseases, including mosquitoes, rats, mice and flies, is crucial to mitigate health risks and prevent epidemics;
- Increased community screening of children for malnutrition and referral for early treatment;
- Community mobilization activities to be increased and continued creation of community awareness of malnutrition prevention, treatment and OTP sites;
- The camp population may need cushioning from the high grinding costs experienced as many households have raised the issue as a constraint and a check at the milling points shows one *malua* of maize costs 7 SSP and that of sorghum costing 5 SSP or *malua* for *malua* approach. This reduces the amount of ration that the households are able to access for household consumption since some has to either be sold or exchanged for grinding;

B. Medium term

- There is need to improve household access to more diverse food items to complement the dry food ration received from WFP; in particular for children and pregnant/breastfeeding mothers;
- Future nutrition interventions should consider education of mothers and caregivers on optimal child care and feeding practices adapted to the local context taking into account the food aid dependency of the refugee population. Health models or positive deviance approaches based on the characteristics of successful child feeding practices of mothers in the refugee community can be a potential intervention to address the wide spread moderate malnutrition of the area through community based nutrition programs;

- There is need for continued and more intensive health and nutrition education focusing on: importance of proper sanitation and hygiene especially using latrines, washing of hands after visiting the toilet; appropriate IYCF feeding practices with special focus on the value and duration of exclusive breastfeeding and the importance of timely introduction of complementary feeding, dietary diversity and appropriate frequency of feeding.

APPENDICES

APPENDIX I: ASSIGNED CLUSTERS, YIDA REFUGEES CAMP

Sampled Bomas - YIDA Nutrition Survey

Geographical unit	Population size	Cluster
Torge	4000	1
Adar	3500	RC, 2
Tbanya	3000	3, 4, 5
Angola	3600	6, RC, 7, 8
Fama	3000	9, 10, 11
Atess	4000	12, 13, 14, 15, 16, 17, 18
Al buram	700	19
Areka	600	
Shat Safiya	2300	RC
Shat Damam	1500	20
Mazarik	1900	
Kululu	2500	21, 22
Um Shoran	750	23, 24
Al Kutang	1200	25, 26
Abu Hshim	500	
Al Hemir	2500	27
Doloka	2500	28, 29
Katsha	1600	30

Geographical unit	Population size	Cluster
Tuna	1500	RC
Tuma	75	
Balanya	200	
Hjar Hnab	200	
Korongu	90	
Tafere	350	RC
Damba	550	
Kega	450	
Kharbia	3000	
Miri	800	
Fur	95	
Umdorin	2500	31, 32, 33
Toludi	100	
Warni	150	
Aliri	200	
Kawalib	500	
Tarawi	1800	34, 35, 36
Tuku	1700	
Ashargia	2400	

APPENDIX 2: ANTHROPOMETRIC SURVEY QUESTIONNAIRE

Note: Administer in Households with Children aged between 6 – 59 months

ANTHROPOMETRIC and HEALTH QUESTIONNAIRE														
<i>(To be conducted in EVERY HH with children 6-59 - from the random starting point onwards)</i>														
Date (D/M/Y): Cluster No: Team No: State: County: Payam: Boma: Village:														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Child No.	HH ref No.	Sex m = Male f = Female	Age in month	Weight in Kg (ex 12.4)	Height in cm (ex 78.1)	Nutritional edema n = No y = Yes	MUAC in cm (ex 11.3)	W/H (Z-score)	Vit.A in last 6 months 0 = No 1 = Yes	Measles Vaccine 0 = No 1 = Yes with EPI card 2 = Yes recall 99 = Child <9m	Illness in past 2 weeks? 0 = No 1 = Yes If no, go to 15	Type of Illness 1 = Fever 2 = Cough 3 = Diarrhea 4 = Skin Infections 5 = Eye infections 6 = Other (specify)	Treatment 0 = None sought 1 = Hospital 2 = GOVT PHCC/U 3 = NGO PHCC/U 4 = Mobile /outreach clinic 5 = Village health care worker 6 = Private physician 7 = Relative/friend 8 = Shop 9 = Traditional practitioner 10 = Pharmacy 11 = Others (Specify)	Did the child sleep under a mosquito net (LLITN) last night? 0 = No 1 = Yes
1														
2														
3														
4														
5														
6														
7														
8														
9														
10														
11														
12														
13														
14														
15														
										***BCG: 0 = Not immunized and no scar, 1 = Yes, vaccinated and scar present				

APPENDIX 5: FS&L QUESTIONNAIRE

(continue questioning HHs where 'Anthro' & Health Info' and 'IYCF Info' has been collected)														
Date (D/M/Y):/...../..... Cluster No: Team No: State: County: Payam: Boma: Village:.....														
3.1	3.2	3.3	3.4	3.5	3.5 (a)	3.6	3.7	3.8	3.9	3.10	3.11	3.12	3.13	3.14
HH Ref. No:	HH size -- (No. of people living in HH)	Is the HH head male or female? ----- 1 = Male 2 = Female	When did the HH arrive in the camp? 1 = 1 week ago 2 = 1 Month ago 3 = >1 - 2 months ago 4 = 3 - 5 months ago 5 = 6 - 11 months ago 6 = > 12 months ago 66 = Other (specify)	What is the administrative State of origin in the North Sudan for the HH? 1 = South Kordofan 2 = North Kordofan 3 = South Darfur 4 = Central Darfur 5 = North Darfur 6 = East Darfur 7 = West Darfur 8 = Khartoum 9 = Blue Nile 10 = Gezira 11 = Gedarif 12 = Kassala 13 = River Nile 14 = White Nile 15 = Northern 16 = Sennar 17 = Red Sea 18 = Other (specify)	If from South Kordofan, which specific County/District/ Wilayat? 1 = Dilling 2 = Rashad 3 = Abu Jubaiyah 4 = Talodi 5 = Kadugli 6 = Lagawa 7 = As Salaam 8 = Other specify	How long did it take you from the place of origin to the camp? (Give the duration in days)	What is the primary reason for leaving the place of origin? 1 = To return to my country 2 = Forceful ejection 3 = Security 4 = Food insecurity 5 = Married to South Sudanese 66 = Other (specify)	Did you receive any food assistance in the last 30 days? ----- 0 = No 1 = Yes (If No go to 3.9)	If YES to 3.7, what type of food did you receive?					What was the main source of food in the past 7 days? (choose 1 option) ----- 1 = Food distribution 2 = Work for food 3 = Sharing from relatives/Neighbors 4 = Market/ shop purchase 5=Borrowing/ debt 6 = Hunting 7 = Fishing 8 = Gathering 9 = Wage labor 10 = 66 = Others (Specify)
									Cereals 0 = No 1 = Yes	Pulses 0 = No 1 = Yes	Oil 0 = No 1 = Yes	Salt 0 = No 1 = Yes	Sugar 0 = No 1 = Yes	

(continue questioning HHs where 'Anthro' & Health Info' and 'IYCF Info' has been collected)

3.15	3.16	3.17	3.18	3.19	3.20	3.21	3.22	3.23	3.24	3.25	3.26	3.27
How many <u>days</u> in past 7 days did your household consumed the following items?								Do you have any other form of income apart from food assistance from NGOs? ----- 0 = No 1 = Yes	If yes in 3.18 what kind of income? ----- 1 = Sale of food ration 2 = Brewing 3 =Sale of natural resources (firewood, charcoal, grass) 4 = Casual labor 5 = Small business 6 = Family support/Remittance 7 = Petty trade 66=Other (specify)	In the past 7 days, have there been times when you did <u>not have enough food or money to buy food</u> ? ----- 0 = No 1 = Yes	If yes in 3.20, which <u>coping strategies</u> were used? (list all options mentioned) ----- 1 = Rely on less preferred/ cheaper food 2 = Borrowing/ kinship support 3 = Limit portion size at meals 4 = Restrict adults' consumption for children 5 = Purchase food on credit 6 = Reduce number of daily meals 7 = Send household members to eat elsewhere 8 = Skip meals entire day 9 = Beg for food 66=Other (specify)	What are the main <u>Constraints</u> currently faced by the HH? (list up to 3 options) ----- 0 = No Constraints 1 = Insufficient ration 2 = Expensive food 3 = Limited access/ movement 4 = Insecurity 5 = Grinding costs 6 = Human sickness 7 = Lack of good shelter/storage facility 8 = Access to health facilities 9 = Lack of water 10 = Congestion in the camp 66 = Other (specify)
<u>Cereal and tubers:</u> Maize/ sorghum/ cassava/ potatoes/ sweet potatoes/ millet/ pasta/ bread/ rice/ other cereals and tubers	<u>Pulses:</u> beans/ lentils/ groundnut s/ cashew nuts/ sesame/ peas	<u>Vegetables</u> / green leaves	<u>Fruits</u>	<u>Animal protein:</u> Beef, goat, pork, poultry, eggs, fish	<u>Milk and other dairy products</u> (yoghurt, curd)	<u>Sugar, honey, sweets</u>	<u>Oil, fats, butter</u>					

APPENDIX 7: CALENDAR OF EVENTS

MONTHS	2007	2008	2009	2010	2011	2012
JANUARY		54 CPA celebrations	42 CPA celebrations	30 CPA celebrations	18 CPA celebrations and referendum vote	6 CPA celebrations and referendum vote
FEBRUARY		53	41	29	17 IDPS return from Khartoum	5
MARCH		52 Youssif Kuwa Day	40 Youssif Kuwa Day	28 Youssif Kuwa Day	16 Youssif Kuwa Day	4 Youssif Kuwa Day
APRIL		51 Census in Sudan / Women Day	39 Easter holiday	27 General election/ Easter	15 S. Kordofan Census	3 Capture of Heglig
MAY		50 SPLA day	38 SPLA day	26 SPLA day	14 SPLA day	2
JUNE		49 Refugee Day	37 Refugee Day	25 Refugee Day	13 War broke in Nuba Mountains/Refugee Day	1 Refugee Day
JULY		48 Crop weeding	36	24 Garang Death remembrance	12 Independence day	0
AUGUST	59	47 Cultural celebration	35 Hunger/Famine	23 Cultural celebration	11 YIDA camp established/Cultural celebration	
SEPTEMBER	58 Bible seminar/Workshop	46 Bible seminar/Workshop	34 Bible seminar/Workshop	22 Bible seminar/Workshop	10 Bible seminar/Workshop	
OCTOBER	57 Opening of schools	45 Opening of schools	33 Ramadan	21 Opening of schools	9 Opening of schools	
NOVEMBER	56 KCPE	44 Harvest	32 Harvesting	20 Harvesting/KCPE	8 Bombing in YIDA/Harvest	
DECEMBER	55 Christmas	43 16 Christmas	31 Christmas	19 Christmas	7 Christmas, death of George Athor	