Standardised Expanded Nutrition Survey (SENS)
East Sudan Refugee Camps

Surveys conducted: June 2015
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ACRONYMS AND ABBREVIATIONS

ANC	Ante Natal Clinic
CI	Confidence Interval
CHWs	Community Health Workers
CSB	Corn-Soya Blend
CTC	Community Therapeutic Care
DEFF	Design effect
ENA	Emergency Nutrition Assessment
ENN	Emergency Nutrition Network
EPI	Expanded Programme on Immunization
Epi Info	Name of CDC software for epidemiological investigations
GAM	Global Acute Malnutrition
FFW	Food for work
FFE	Food for education
GFA	General Food Assistant
HAZ	Height-for-Age z-score
Hb	Haemoglobin
HH	Household
HIS	Health Information System
HAI	Human Appeal International
I**Ps**	Implementing Partners
LLINs	Long-Lasting Insecticidal Nets
LNS	Lipid-based nutrient supplements
IYCF	Infant and Young Child Feeding
Lpppd	Litres per person per Day
LNS	Lipid-based Nutrient Supplement
MAM	Moderate Acute Malnutrition
MCH	Maternal and Child Heath
MOH	Ministry of Health
MUAC	Middle Upper Arm circumference
NCHS	National Centre for Health Statistics
OTP	Out-patient Therapeutic Programme
PDM	Post Distribution Monitoring
ProGres	UNHCR registration database for refugees
RTI	Respiratory Tract Infection
SAM	Severe Acute Malnutrition
SC	Stabilization Centre
SD	Standard Deviation
SFP	Supplementary Feeding Programme
SMART	Standardised Monitoring & Assessment of Relief & Transitions
SRC	Sudanese Red Cross
TFP	Therapeutic Feeding Programme
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Funds
WASH	Water Sanitation and Hygiene
WAZ	Weight-for-Age z-score
WHZ	Weight-for-Height z-score
WFP	World Food Programme
WHO	World Health Organization

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EXECUTIVE SUMMARY

Eastern Sudan has the largest concentration of refugees in the country, some of them since 1960's and 70's, making it one of the most protracted refugee operations in the world. As of May 2015, ProGres database recorded a total of 77,619 refugees living in all of the camps in Eastern Sudan. Predominantly are Eritreans and few Ethiopians. These refugees reside in 9 camps in Kassala, Gederef, and Gezira states. In response, UNHCR alongside co-operating partners like WFP, Commissioner of Refugees (COR) and the relevant line ministries- have established water and sanitation systems, health facilities, feeding programmes and many other services to maintain bearable living conditions in the camps.

UNHCR in cooperation with WFP, COR, Ministry of Health (MOH), the Sudanese Red Crescent Society (SRC) and Human Appeal (HAI) conducted a Standardised Expanded Nutrition Survey (SENS) across the nine refugee camps in Eastern Sudan from 1 to 18 June 2015. A cross-sectional survey was conducted by using simple random sampling, which has been chosen as the preferred method due to the arrangement of households in East Sudan refugee camps which is not linear, and does not follow any specific pattern to allow for systematic random sampling, neither household are arranged in sufficient blocks to allow for a cluster design. An updated list of all households exists, and the total number of households is accurately known and therefore simple random sampling has been used.

The overall objective of survey was to assess the general health and nutrition status of east Sudan refugees' and to formulate workable recommendations for appropriate nutrition and public health interventions. The specific objectives include:

- To measure the prevalence of acute malnutrition in children aged 6-59 months,
- To measure the prevalence of stunting in children aged 6-59 months,
- To determine the coverage of measles vaccination among children aged 9-59 months,
- To determine the coverage of vitamin A supplementation received during the last 6 months among children aged 6-59 months,
- To assess the two-week period prevalence of diarrhea among children aged 6- 59 months,
- To measure the prevalence of anemia in children aged 6-59 months and in women of reproductive age between 15-49 years (non-pregnant),
- To investigate IYCF practices among children aged 0-23 months,
- To determine the population's access to, and use of improved water, sanitation and hygiene facilities,
- To determine the ownership of mosquito nets (all types and LLINs) in the households,
- To determine the utilization of mosquito nets (all types and LLINs) by the total population, children 0-59 months and pregnant women,

The refugee camps have been classified into 3 main domains as follows:

1. **Shagarab camps**: far from urban areas and are receiving new arrivals.

2. **Labor-based camps**: located in agricultural areas where refugees are employed as laborers and/or near towns where refugees can find other forms of employment.
3. **Land-based camps**: households are allocated some land for agriculture use by the Government.

The sample size in each domain was calculated using ENA software, 21 April 2015 version, using the assumptions in Table 1.

Table 1: Assumptions for sample size calculation in East Sudan refugee camps

	Shagarab camps	**Labor-based camps**	**Land-based camps**
Population	**34,890**	**29,652**	**12,884**
% below 5 years	11%	7%	8%
Average household size	3.0	3.9	4.5
Estimated prevalence	20%	20%	20%
Desired precision	5%	5%	5%
% non-response	14%	19%	13%
Children to be included	230	217	195
Households to be included	859	983	667

All eligible children aged 0-59 months from all selected households were included in the assessment of anthropometry, health and infant and young child feeding (0-23 months), whilst half of the selected households were selected for WASH, Mosquito net coverage, women questionnaire and anemia measurements.

A total of 6 teams were involved in collecting data simultaneously in one camp each consisting of 4 team members (interviewer, anthropometric measurer, and anthropometric assistant and hemoglobin measurer). The enumerators were trained for 5 days including a day for standardization test and pilot test. Data collection was conducted from 1 June to 18 June 2015 with coordination and supervision from UNHCR, COR, Human Appeal, Sudanese Red Crescent and Ministry of health (MOH). Smart Mobile Phones uploaded with the questionnaires were used for data collection of household level indicators (WASH, Mosquito net use) and individual level indicators (sex, age, weight, height/length, edema, MUAC, Hb, child enrollment in feeding program, measles vaccination, Vitamin A supplementation, diarrhea in the last two weeks in children 6-59 months, and IYCF practices in children 0-23 months). Data was transferred to excel formats through an offline server, into which data was uploaded at the end of each day. Data analysis for anthropometric data was done using ENA for SMART and Epi info version 3.5.4 for the other data sets.

Table 2: **Summary of key findings, East Sudan Refugee Camps, June 2015**

	Land-based	**Shagarabs (I, II,**	**Labor -based**	**Classificat**

	camps (Abuda, Um Gargour, Fau V)	III)	camps (Girba, Kilo 26 Wad Sherife)	ion of public health significance or target
Date of survey	1 - 6 June 2015	7 -13 June 215	14 -18 June 215	
Children 6-59 months, % (95% C.I)				
Acute Malnutrition (WHO 2006 Standards)				
Global Acute Malnutrition (GAM)	9.5 (7.0-12.8)	17.3 (14.5-20.4)	20.1 (16.2-24.5)	**Critical if ≥ 15%**
Moderate Acute Malnutrition (MAM)	8.8 (6.4-11.9)	14.2 (11.7-17.1)	16.4 (12.9-20.6)	
Severe Acute Malnutrition (SAM)	0.8 (0.3-2.2)	3.1 (2.0- 4.8)	3.7 (2.2-6.2)	
Edema	0.0	0.0	0.0	
Stunting (WHO 2006 Standards)				
Total stunting	48.6 (43.7-53.5)	57.9 (54.0-61.7)	44.8 (39.6-50.1)	**Critical if ≥ 40%**
Severe stunting	18.3 (14.7-22.4)	21.9 (18.9-25.3)	14.8 (11.5-19.0)	
MUAC malnutrition				
MUAC <125mm	6.2 (4.2-8.9)	7.4% (5.7- 9.7)	6.7 (4.5- 9.8)	
MUAC 115-124mm	5.4 (3.6-8.1)	5.2 (3.7- 7.1)	5.6 (3.6- 8.4)	
MUAC <115mm	0.7 (0.3-2.1)	2.3 (1.4- 3.7)	1.1 (0.4- 2.8)	
Anemia				
Total Anemia (Hb <11g/dl)	45.0 (39.1-51.0)	53.2 (47.6 – 58.7)	43.6 (39.1- 51.0)	**High if ≥ 40%**
Mild (Hb 10-10.9g/dl)	21.1 (16.4-26.3)	29.1 (24.3-34.4)	26.9 (20.1-34.6)	
Moderate (Hb 7-9.9g/dl	22.1 (17.4-27.5)	23.2 (18.8-28.3)	15.4 (10.1-22.0)	
Severe (Hb <7g/dl)	1.8 (0.6-4.1)	0.9 (0.2 -2.9)	1.3 (0.2-4.6)	
Measles vaccination with card (9-59 months)	86.5 (82.7 - 89.7)	83.1 (79.9- 85.8)	82.7 (78.3 - 86.6)	**Target of >= 95%**
Measles vaccination with card or recall (9-59 months)	97.4 (95.1-98.7)	96.8 (95.1-98.0)	97.6 (95.2- 98.9)	
Vitamin A supplementation coverage with card, within past 6 months (6-59 months)	27.1 (22.9 - 31.8)	0.8 (0.3 -1.9)	1.9 (0.9 - 4.2)	**Target of >= 90%**
Vitamin A supplementation coverage with card or	50.9 (45.9-55.8)	5.3 (3.8 -7.4)	3.6 (2.0-6.3)	

recall, within past 6 months (6-59 months)				
Morbidity				
Diarrhea in past 2 weeks	9.3 (6.8 - 12.7)	13.0 (10.6- 15.9)	8.9 (6.3 -12.5)	
CHILDREN 0-23 MONTHS % (95% CI)				
Infant and Young Children Feeding Practices				
Early initiation of breastfeeding	86.6 (79.9 -91.7)	99.2 (97.1- 99.9)	95.3 (90.2 - 98.3)	
Exclusive breastfeeding under 6 Months	57.1 (34.0 -78.2)	50.0 (33.8- 66.2)	66.7 (38.4 - 88.2)	
Continued breastfeeding at 1 year	85.7 (67.3 -96.0)	94.7 (82.3- 99.4)	84.6 (65.1 - 95.6)	
Continued breastfeeding at 2 years	47.8 (26.8 -69.4)	69.4 (54.6- 81.7)	42.9 (21.8 - 66.0)	
Introduction of solid, semi-solid or soft foods	52.2 (30.6 -73.2)	40.5 (24.8- 57.9)	47.8 (26.8 - 69.4)	
Consumption of iron-rich or iron-fortified foods	52.2 (30.6 -73.2)	27.9 (22.4 -34.0)	32.0 (24.1- 40.9)	
Children bottle fed	3.8 (1.4 - 8.1)	2.4 (0.9 - 5.2)	5.5 (2.4 - 10.6)	
Minimum dietary diversity	19.4 (13.2 -27.0)	14.6 (10.4 -19.6)	26.6 (19.1- 35.1)	
Minimum meal frequency	23.0 (16.3 -30.9)	16.6 (12.2- 21.8)	26.6 (19.1- 35.1)	
Minimum acceptable diet (breastfeeding)	6.9 (2.8-13.8)	3.8 (1.5 - 7.7)	12.5 (6.4 - 21.3)	
Consumption of FBF++ (Super cereal plus)	26.8 (18.3 -36.8)	25.8 (19.2-33.3)	22.1 (14.2 - 31.8)	
Anemia (non-pregnant women)				
Total Anemia (Hb <12g/dl)	33.1 (27.6-39.0)	32.1 (27.0-37.6)	42.9 (35.1-50.9)	**High if >=40%**
Mild (Hb 11-11.9g/dl)	16.4 (12.2-21.3)	13.8 (10.3-18.2)	26.1 (19.5-	
Moderate (Hb 8-10.9g/dl)	14.5 (10.6-19.3)	17.3 (13.4-22.0)	12.4 (7.8-18.5)	
Severe (Hb <8g/dl)	2.2 (0.8-4.7)	0.9 (0.2-3.0)	4.3 (1.8-8.8)	
Programme coverage (pregnant women)				

Pregnant women currently enrolled in ANC	83.3 (65.3-94.4)	80.9 (69.5-89.4)	82.9 (67.9-92.8)	
Pregnant women currently receiving iron folic acid pills	63.3 (43.9-80.1)	42.6 (30.7-55.2)	70.7 (54.5-83.9)	
WATER, SANITATION AND HYGIENE				
Proportion of households using an improved drinking water source	91.2 (86.9 -94.4)	66.7 (61.4 - 71.6)	66.3 (59.2 - 72.9)	
Proportion of households that use a covered or narrow necked container for storing their drinking water	63.1(56.7- 69.1)	72.4 (67.3 - 77.0)	77.0 (70.5 - 82.7)	
Water quantity, % (95% CI)				
Proportion of households that access: **≥ 20 lpppd** **15-<20 lpppd** **<15 lpppd**	 87.6 (82.8-91.4) 6.4 (3.7-10.2) 6.0 (3.4-9.7)	 51.6 (46.2 - 57.0) 15.7 (12.1 - 20.0) 32.8 (27.9 - 38.0)	 64.3 (57.1 -71.0) 14.3 (9.7- 20.0) 21.4 (15.9 -27.8)	**Average quantity of water available per person/day** **> or = 20 liters**
Satisfaction with drinking water supply, % (95% CI)				
Proportion of households that say they are satisfied with the drinking water supply	51.0 (44.6 - 57.4)	37.1(32.0 - 42.5	53.6 (46.3 - 60.7)	
Safe excreta disposal, % (95% CI)				
Proportion of HH using an improved excreta disposal facility (improved toilet facility, not shared)	29.0 (23.4 -35.2)	17.2 (13.4 - 21.6)	34.4 (27.6 - 41.6)	
Proportion of HH using a shared family toilet	5.4 (2.9 -9.0)	2.3 (1.1 - 4.7)	1.6 (0.3 - 4.6)	
Proportion of HH using a communalToilet	2.5 (0.9 - 5.3)	2.9 (1.5 - 5.5)	2.6 (0.9 - 6.1)	
Proportion of HH using an unimproved toilet	63.1 (56.6 -69.2)	77.6 (72.8 - 81.9)	61.4 (54.0 - 68.4)	
Proportion of HH with	65.8 (56.6 -74.2)	33.0 (26.2 - 40.3	60.6 (50.0 - 70.6)	

children <3 yrs. disposing of faeces safely				
MOSQUITO NET COVERAGE				
Mosquito net ownership				
Proportion of HHs owning at least one LLIN	38.3 (32.0-44.9)	29.7 (25.0-34.8)	43.1 (36.1-50.4)	**Target of >80**
Average number of persons per LLIN	6.7	9.1	4.4	**2persons per LLIN**
Mosquito utilization				
Total HH members (all ages) who slept under an LLIN	5.0	2.1	5.0	
Children 0-59 months who slept under an LLIN	8.6	4.7	11.4	
Pregnant women who slept under an LLIN	20.0	5.5	25.8	

Interpretation

- The overall nutritional situation in the Shagarb and Labour based camps is high with Global Acute Malnutrition (GAM) rate at 17.3% and 20% respectively a level indicative of a crisis, being above WHO threshold of 15%. While land based camps are acceptable with Global Acute Malnutrition of 9.5%.
- The stunting prevalence has remained high over the years. Stunting rates in 2015, were 48.6% (43.7-53.5), 57.9% (54.0-61.7), 44.8% (39.6-50.1) in Land based, Shagarab and Labor based camps respectively. However, the result compared to 2013 survey results has slightly declined in all camps though the stunting levels still continue to be above the WHO threshold of < 40 per cent.
- The prevalence of anemia among children (6-59 months was 45.0% (39.1-51.0) in land based camp, 53.2% (47.6 – 58.7) in Shagarb camps and 43.6 (39.1- 51.0) in labor based camps. The levels of anemia among children in all camps remained above the WHO “high” classification for public health significance.
- The programme enrolment for SFP and OTP programmes was low across all the camps. However, due to the sample size and method used, this cannot be interpreted as overall programme coverage.
- The coverage of measles vaccination with card or recall were above 90% in Land based, Shagrab and Labour based Camps, however, the Vitamin A supplementation was much low across all the camps.
- The proportion of children introduced to breast milk within an hour of birth (timely initiation of breastfeeding) was high in Land based Camps, Shagarab and Labor bases camps, 86.6%, 99.2%) and 95.3% respectively, 57.1%, 50.0% and 66.7% of children had been exclusively breastfeed. However, 52.2% (30.6 -73.2), 40.5% and 47.8% of 6-8 months children had been introduced to solids food, and consumption

of iron-rich foods were 52.2%, 27.9% and 32.0% in Land based, Shagarab and Labor based Camps respectively..

- The proportion of households surveyed using an improved drinking water source were 91.2%, 66.7% and 66.3% in land based, Shagarab and labour camps respectively. The proportion of households using ≥ 20 litres per person per day were 87.6%, 51.6% and 64.3% in Land, shagarab and Labor camps, respectively; the proportion of households using an unimproved toilet were high at 63.1%, 77.6% and 61.4%. Not surprisingly, there were a low proportion of households with children <3 years disposing of faeces appropriately.
- The proportion of households owing at least one LLIN were 38.3%, 29.7% and 43.1% in Land based, Shagarb and Labour based camps respectively, much below the Target of >80%. While the total HH members of (all ages) who slept under an LLIN was very low, 5% across all camps.

Recommendations

Immediate term

- Continue with the existing programs at the SFP, OTP and SC coupled with enhanced community outreach strategy for active and passive case finding of the cases with malnutrition.
- WFP to continue the supplementary feeding programme for children 6-59 months and ensure increased awareness and sensitisation for proper utilization of the supplementary foods in the target group.
- Strengthen the awareness, promotion, and protection of Infant and Young Child Feeding through baby friendly space, expanded mother to mother support groups and by accelerating sensitisation and awareness creation on appropriate breast-feeding and complementary feeding practices.
- Strengthen the routine measles vaccination programme by working closely with the Community health workers through defaulter tracing at block level and house to house checking for the immunisation status of under 5 and referring those identified as not immunized.
- Organize Mass Vitamin A supplementation as soon as possible, and ensure a regular schedule of the supplementation after every 6 months.
- Improve coverage and maintenance of household latrines (1 latrine for 1 to 2 families).
- UNHCR, COR in collaboration with the health partners to ensure provision of adequate mosquito nets coupled with strong message on its utilization.

Medium term

- UNHCR to continue to conduct annual nutrition surveys in May/June (the lean season) as in 2015, so as to allow comparison and monitor the trends.
- UNHCR to distribute water containers to all households in camps to increase safe storage of water for domestic use.

- Increase the ability of the refugees to produce own food at household level in order to diversify not only their daily dietary intake but also income through available agriculture based production options. An activity currently implemented jointly by UNHCR and FAO at pilot level in three refugee camps.

1. INTRODUCTION

Kassala State lies between latitude 34° 12' and 36° 57' East, and between longitude 14° 12' and 17° 12' North; with a total area of 42, 282km^2.The state shares an international border with Eritrea to the East. Nationally, it borders Red Sea State and River Nile State to the North, Gezira State to the West, and Gedaref State to the South. The state is composed of eleven localities (*mahaliyas*). Rainfall ranges from a low of around 50 – 150 mm per annum in the northernmost part of the state to around 150 – 300 mm per annum across most of the middle part of the State, where as the southern areas receive between 300 and 550 mm annually.

High levels of cultural and ethnic diversity characterize the population of Kassala State. This is, in large part, a result of historically protracted and significant waves of migration to the area. The main ethnic groups in the state are Beja, Rashaida, Shukriya, Halaween and Kwahla. The predominant indigenous ethnic grouping in the state is the Beja. This nomenclature of tribes is comprised primarily of the Hadendowa, Beni Amir and the Halanga peoples. Bordering Eritrea and Ethiopia, Kassala State has also received several large waves of Ethiopians and Eritrean refugees during the conflict that took place there. The latest large influx of people, from these areas, took place in 2000. Nonetheless, protracted instability along the border has seen the periodic influx of refugees since 1980s and continues to this day.

Eastern Sudan has the largest concentration of refugees in the country, some of them since 1960's and 70's, making it one of the most protracted refugee operations in the world. As of May 2015, *ProGres* database recorded a total of 77,619 refugees living in all the camps of Eastern Sudan. Predominantly are Eritreans and few Ethiopians. These refugees reside in 9 camps in Kassala, Gederef, and Gezira states. Owing to scant resources and livelihoods opportunities, most asylum- seekers temporarily stay in the camps before moving on to urban areas in Sudan and beyond in search of better economic prospects. Consequently, the population figure of registered refugees has remained almost stable for the past six years. Although some refugees can find occasional work in agricultural fields and in cities as laborers, the lack of access to meaningful employment hinders possibilities for self-reliance. As a result, many refugees live in a desperate situation and are highly dependent on relief food assistance and external aid. For that reason, refugees are highly susceptible to poverty and malnutrition.

All basic services in the camps are delivered free of charge and are accessible to both the refugees and the local host community members from villages and towns around the camps. The main direction of the UNHCR operation in Eastern Sudan is shifting from humanitarian assistance to self-reliance in order to reduce refugee aid dependency in a medium as well as a long term period. In this perspective, the vision of UNHCR is to gradually integrate all the basic services with the line ministries to ensure long-term sustainability and reinforce refugee communities' self-management capacities to promote their meaningful participation in managing these basic services. This entails gradual upgrading of infrastructure and facilities in the camps as well as upgrading some of the sector specific standards and indicators in preparation to the hand over.

The agency works with 18 implementing partners, including 7 government partners. Projects with limited exceptions are administered through tripartite agreements between UNHCR, COR and each partner organization for the implementation of the projects. The scarce interest in this region of Sudan over many years, coupled with the restrictive access and permission for INGOs have resulted in limited options for partnerships.

1.1 Food Security and Livelihood interventions

Food has traditionally been the means used by WFP for transferring resources to beneficiaries. Refugees received food assistance from WFP mainly through General Food Distribution (GFD), Nutrition Supplementary Feeding Programmes (SFP), Food for work (FFW) and food for training (FFT). The 2011 Joint Assessment Mission (JAM) revealed that most of refugees' beneficiaries were selling and bartering the in-kind food provided on monthly basis in exchange for access to preferred food and other unmet needs. This food is mainly sold in poor terms of trade compared to the local market prices for similar commodities. Nonetheless, refugees have very limited access to additional income and have limited coping strategies to address gaps faced by the households. The JAM recommended for alternate means of food assistance, including cash or vouchers as mitigation mechanisms to address these challenges.

Following WFP's shift from food aid to food assistance and the global WFP-UNHCR cash and voucher agreements, WFP in agreements with UNHCR and COR conducted in-depth market and vendor assessments and beneficiary consultations in regards to voucher implementations. Findings from these assessments showed that camps in the eastern Sudan have all year functional and accessible markets and the traders are able to respond to the anticipated increase in demand. Consultations with the refugee communities at various levels indicated interest towards the voucher modality in order to access to greater variety of foods in the market.

In 2014, WFP and UNHCR expanded food voucher system as a way of providing relief food assistance in all camps. All new refugees receives voucher for three months pending RSD process, then receives vouchers for two years' worth 84 sdg/month/ person, while targeted old case receives a 42 SDG voucher which they use to purchase food stuffs of their choice in the local market from a designated traders. Those target refugees who receive voucher assistance, therefore, depend directly on the availability, accessibility and stability of food prices in the Sudanese markets where as some of those excluded from food assistance are completely relying on UNHCR livelihood interventions.

Total # of Refugees eligible for food Vs. Total # of Refugees in the camps

Camp_Name	# of eligible for food		Total # of Ref Receiving food	Total # of Ref		Total # of Ref
	Old Case	New Case		Gender		
	Individual	Individual		Male	Female	
Shagarab I	5385	2373	7758	9043	8451	17494

Shagarab II	4094	297	4391	4906	5615	10521
Shagarab III	2173	4	2177	2825	3400	6225
Um Gargour	2002	3	2005	4620	4525	9145
Wad Sharifey	5242	9	5251	6575	8504	15079
Wad Sherifey village	290	0	290	302	443	745
Kilo 26	2623	0	2623	4004	4292	8296
Abuda	679	0	679	1390	1450	2840
Girba	1839	15	1854	2961	3303	6264
Total	24327	2701	27028	36626	39983	76609

The food voucher system is considered a very efficient and effective modality of distributing relief food assistance in areas where it is fully functional. The new system is reliable and time saving, reaching many refugees with very low administration costs and eliminating logistics costs for transporting food commodities to the camps. Refugees redeem their vouchers to choose familiar and fresh foods from the local markets, their most trusted source. No sale of relief assistance food commodities reported or observed, since refugees choose their favorable foods. The new system plays a great role in the local economics since WFP designate local traders, at the same time reduces dependency on strange and foreign foods. It actually fosters ownership and trust in the system by traders and refugees / beneficiaries. The food voucher system directly depends on seasonality and local food markets in the camps as well as the country. Despite the said advantages, the consequences of the new system are still unknown and not yet studied in context of the East Sudan operation.

UNHCR office promotes self-reliance of protracted refugees, by providing training to undertake a range of self-employment initiatives in areas like agriculture production, livestock production, micro-enterprises, Rotating Savings and Credit Associations (ROSCA). The refugees with the acquired skills can find employment in the agricultural fields or in cities. Although some refugees may find occasional work, it is hard to access meaningful employment for self-reliance owing to Sudan's strict encampment policy which limits refugee mobility to seek out work.

In December 2013, UNHCR made a UNHCR- COR Joint Livelihoods Assessment in 6 Camps namely; Abudda, Umgargour, Fau 5, Wadsharifey, Shagarab 1 and Kilo 26, where analysis and impacts of the Livelihoods Interventions shared. In the Household Annual Income trend noted an increased in the reporting year compared to the reported income in 2012 (taking into consideration the Sudan inflation rates for 2012 and 2013 upon doing the calculations and analysis). Livelihoods comprehensive and diversified supports such as micro-enterprises, market oriented vocational skills trainings; village based lending and savings services, entrepreneurship and business incubators, improved agricultural practices, veterinary and poultry services, market facilities and handicrafts made a cumulative impact to elevate the household economic capabilities and coping abilities to address crises and shocks.

Loans for small business, Rotating Savings and Credit Association (RoSCA), Livestock

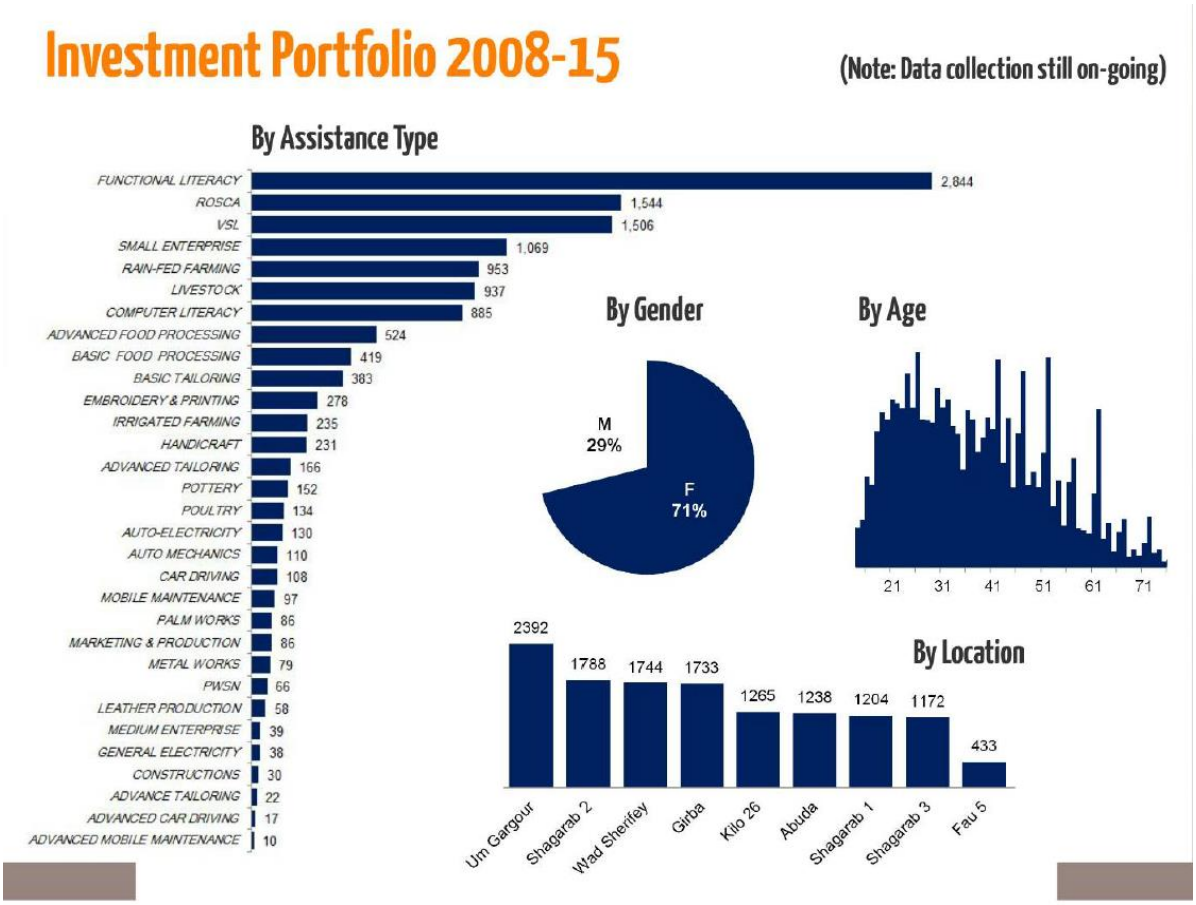
Producton and Irrigated agriculture creates significant impact to the refugees households livelihoods and to the lives of women in participating productive roles and sharing economic responsibilities for their households. One best practice is the newly piloted VSL approach started 2013-2014 at the camps. It has been observed that that a number of women now involved in income generation activities and is strengthening their household economy along side with their male counterparts. This is one of the great change in gender relations and socio economic-environment in the camps where testimonies from beneficiaries shared. Assistance on Market Oriented Vocational Training Courses been offered which is based on its 2014 market assessment done through our implementing partners both in household's and youths at the camps. Follow-up individual interviews from the graduates of auto electricity, car mechanics, driving, mobile phones maintenance, metal work and advance tailoring results indicated that majority of them used the skills they gained and are earning.

Refugees mainly depend on farming and livestock rearing yet their access to land varies among camps such as; Wadsharifey doesn't have access to arable lands while the Umgargour and Abudda Camps have access to government lands while the other camps mainly rely on private agricultural lands; rent/sharing but the refugees households economic ability influences their accessibility for the lands.

Irrigated and rainfed farming are the main agricultural practices in Eastern Sudan. Kilo 26 and Fau 5 Camps where on irrigated farming while the rest rely on rain-fed farming. Varied assistance made available to the qualified beneficiaries through its Rural Livelihood activities to mentioned a few were;

- Land access, tractors, equipment. Training, extension services
- Animals, vaccination campaigns, extension services
- Local Value Chain development: Processing (edible oil production), Horticulture and Milk production

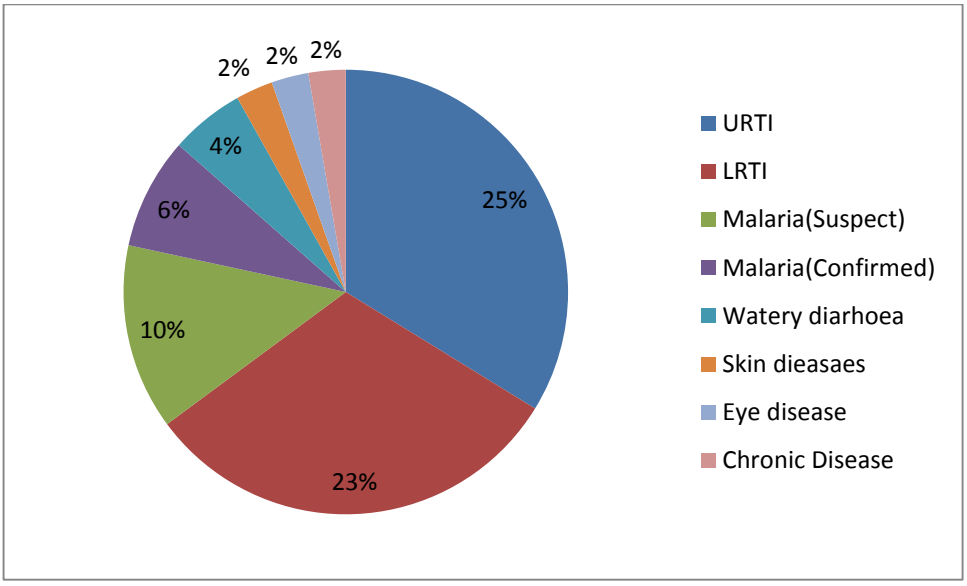
At a Glance Livelihood Support invested since 2008-2015.



1.2 Health Situation

UNHCR in collaboration with the MoH and UN agencies run reasonably well-equipped and well-staffed clinics in every camp through health partners: Human Appeal International (HAI) and Sudanese Red Crescent Society (SRCS). UNHCR provides drugs, equipment and pays salaries for all staff. The MoH, UNICEF and WHO sometimes complement UNHCR supplies with basic drugs and nutrition supplements. The camp clinics provide both inpatient and outpatient facilities, ANC, delivery and PNC facilities, immunization, laboratory facilities, Prevention and treatment of HIV as well as referrals. In the camps of Shagarabs there are three clinics in each of the camps. The refugee community also provides home visitors (HV) working as community health workers with IPs in educating the masses about healthy habits, nutrition and hygiene and sanitation. Besides community sensitizations, they also actively find malnourished children from the community and refer them to feeding programmes in the camps.

Figure 1. Under-five proportional morbidity from June 2014 to June 2015 showing (UNHCR Health Information System)



1.3 Nutrition Situation

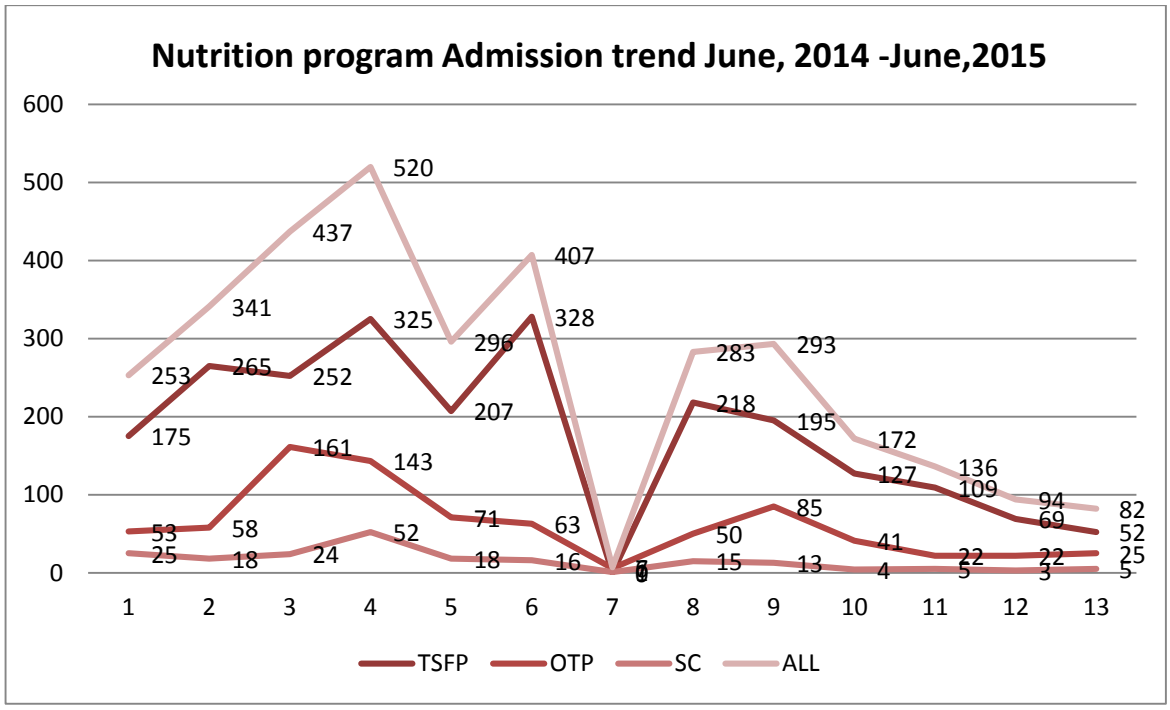
UNHCR, WFP, Kassala state MoH, COR and IPs implements a fully-fledged Community Management of Acute malnutrition (CMAM) programme in all camps where over 1962 malnourished under five children (1,815 in the targeted supplementary feeding programme, 144 in outpatient therapeutic care programmer and 3 in stabilization centre) have been treated for acute malnutrition. The CMAM programme is implemented along with other programmes like the promotion and protection of optimal infant and young child feeding practices.

UNHCR provides the basic drugs, Resomal, formula milk (F75) and plumpy nut for both the stabilization centre (SC) and the out-patient therapeutic programme (OTP) as well as Plumpy doz to high risk children with MAUC between 125 mm to 135 mm while WFP provides CSB, sugar and vegetable oil to children 6 -59, pregnant and lactating mothers in the supplementary feeding programme (SFP). The stabilization center is an inpatient facility house in the camp clinic, targeting especially severely malnourished children with medical complications and without appetite. These children are clinically rehabilitated to regain appetite, and then referred to the OTP for severely malnourished children with appetite and no medical complications. The OTP operates once a week and admits severely malnourished children without any medical complication from the community. All children admitted in the OTP are treated with plumpy nut ‘a ready to use therapeutic food’ (RUTF). After a maximum stay of 12 weeks in the OTP, children are referred to the SFP where they

take home weekly rations of CSB, sugar and oil provided by WFP. The SFP also serves all pregnant and lactating mothers with the same rations. It is the responsibility of community health workers (home visitors) in the camps to find and refer all malnourished children from the community to the respective feeding programmes, on a weekly basis. Under the SFP, UNHCR also provides special annual LNS supplements, Plumpy doz to high risk children with MUAC between 125 mm to 135 mm. At the distribution points, mothers were given specific messages and instructions on how to use plumpy doz effectively and it was made clear that plumpy doz was not in any way supposed to replace or reduce the frequency of breastfeeding. Mothers were instead encouraged to continue with breastfeeding up to at least two years with appropriate complementary foods.

The monitoring and evaluation team of UNHCR regularly supervises the CMAM nutritional activities in the camps. The programme unit, through the nutrition section, is mandated to report weekly, monthly and annually. Thus, partners are required to report weekly and monthly in line with performance indicators. In addition, UNHCR conducts annual health and nutritional surveys as well as biannual Joint Assessment Mission (JAMs) in the camps.

Figure 2. Nutrition Programme trend from June, 2014 to June 215 (Health Information System)



1.4 Water, Sanitation and Hygiene (WASH)

The refugee camps have various sources of drinking water like deep boreholes, rivers and canals among others. The water tapped from rivers and canals sources is treated and chlorinated before being supplied to the refugees and host communities. In all camps refugees needed less than 30 minutes to fetch one route of their water and generally water storage was safe with more than half of refugees storing their water in narrow necked and

covered containers. UNHCR Kassala sub-office regularly carries sanitation and hygiene promotion campaigns at household level through the camp water management committees. The office also distribute soap, narrow necked water containers and many other sanitary materials to refuges. Currently, UNHCR has undertaken a massive latrine construction aiming at having one latrine per household. However, according to the 2015 health and nutrition survey findings-sanitation and hygiene still remain a challenge in the camps, with a mere tenth of refugee households using latrines while the majority of refugee households defecate in open areas around the camps.

1.5 Survey Objectives

- To measure the prevalence of acute malnutrition in children aged 6-59 months,
- To measure the prevalence of stunting in children aged 6-59 months,
- To determine the coverage of measles vaccination among children aged 9-59 months,
- To determine the coverage of vitamin A supplementation received during the last 6 months among children aged 6-59 months,
- To assess the two-week period prevalence of diarrhea among children aged 6- 59 months,
- To measure the prevalence of anemia in children aged 6-59 months and in women of reproductive age between 15-49 years (non-pregnant),
- To investigate IYCF practices among children aged 0-23 months,
- To determine the population's access to, and use of improved water, sanitation and hygiene facilities,
- To determine the ownership of mosquito nets (all types and LLINs) in the households,
- To determine the utilization of mosquito nets (all types and LLINs) by the total population, children 0-59 months and pregnant women

2. METHODOLOGY

2.1 Sample size

UNHCR in cooperation with COR, Ministry of Health (MOH), the Sudanese Red Crescent Society (SRC) and Human Appeal (HAI) conducted a Standardised Expanded Nutrition Survey (SENS) across nine refugee camps in Eastern Sudan from 1 to 18 June 215. A cross-sectional survey was conducted by using simple random sampling, which has been chosen as the preferred method due to the arrangement of households in East Sudan refugee camps which is not linear, and does not follow any specific pattern to allow for systematic random sampling, neither household are arranged in sufficient blocks to allow for a cluster design. An updated list of all households exists, and the total number of households is accurately known and therefore simple random sampling has been used.

The refugee camps have been classified into 3 main domains as follows:

1. **Shagarab camps**: far from urban areas and are receiving new arrivals.
2. **Labour-based camps**: located in agricultural areas where refugees are employed as labourers and/or near towns where refugees can find other forms of employment.
3. **Land-based camps**: households are allocated some land for agriculture use by the Government.

The sample size in each domain was calculated using ENA software, 21 April 2015 version, using the assumptions in Table 1.

Table 3. Assumptions for sample size calculation in East Sudan refugee camps

	Shagarab camps1	Labour-based camps2	Land-based camps3
Population	34,890	29,652	12,884
% below 5 years	11%	7%	8%
Average household size	3.0	3.9	4.5
Estimated prevalence[4]	20%	20%	20%
Desired precision	5%	5%	5%
% non-response	14%	19%	13%
Children to be included	**230**	**217**	**195**
Households to be included	**859**	**983**	**667**

All eligible children aged 0-59 months from all selected households were included in the assessment of anthropometry, health and infant and young child feeding (0-23 months), whilst half of the selected households were selected for WASH, Mosquito net coverage, women questionnaire and anaemia measurements.

2.2 Sampling procedure: selecting households and individuals

The sampled households were randomly drawn from the ProGres household list. The households were arranged according to their zones and assigned to the survey teams, and the survey teams carried a list of addresses to visit the sampled households.

For Module 1 (Anthropometry and Health) and Module 3 (IYCF) all eligible children in all sampled households were to be included. For Module 2 (Anemia) and the household modules, 4 (WASH) and 5 (Mosquito Net Coverage), half of the households on the sampling list were included. All eligible children and women within the selected household were

[1] Shagarab I, II and II: far away from urban centre and are receiving new arrivals

[2] Located in agricultural areas where interested refugees are provided with employment as laborers in the fields, and/or are located near towns where they can also find other forms of employment: Wad Sharifey, Kilo 26, Girba

[3] Refugee households are allocated some land for agriculture use, by the Government: Um Gargour, Abuda, Fau V

[4] The upper limit of the 95% C.I in the previous survey (2013)

assessed.

The following procedures were followed in special cases:

Absences: If an individual or an entire household was absent, the team leader recorded this information and determined another time to return on the same day. The team returned to an absent household or revisited an absent individual up to two times, on the same survey day. If they were unsuccessful after this, the absent households were replaced.

Refusals: If an individual or an entire household refused to participate, then it was considered a refusal and this information was recorded. Absent individuals or households and refusals were not replaced.

Abandoned households: A household was considered abandoned if neighbors reported that nobody has lived in that household for more than one month or if the inhabitants had been repatriated. This household was replaced by another household and it was considered as abandoned.

Household with no children: If it was determined that a selected household did not have any eligible children, the questionnaire was still be administered to the household and any eligible women**.**

Disabled child: If a physical deformity prevented the measurement of child's weight or height, the child was recorded as missing for these variables, but the child was included for the assessment of the other indicators (e.g. edema, measles vaccination, vitamin A supplementation).

The survey respondent was the mother of children aged below 5 years or the primary caretaker of those children**.**

2.3 Questionnaires

The questionnaire was translated from English to Arabic and was administered in the preferred language of the respondent. The questionnaire is included in **Appendix 7** and had five out six standard modules of the UNHCR SENS guidelines:

Module 1 -Anthropometry and health: Included data on anthropometry, measles vaccination, Vitamin A supplementation, and diarrhea for children 6-59 months.

Module 2 -Anemia: Included data on Hemoglobin measurements for children 6-59 months and women15-49 years, as well as data on pregnancy status, ANC enrolment and iron and folic acid pills coverage for women 15-49 years.

Module 3 -IYCF: Included data on breastfeeding initiation, exclusivity and duration and feeding practices for children aged 0-23 months.

Module 4 -WASH: Included data on access to improved drinking water sources, storage of water, quantity of water used per household, time to collect water, satisfaction with water supply, type and quality of excreta disposal facility in use and safe disposal of young children's stools for households.

Module 5 -Mosquito Net Coverage: Included data on mosquito net ownership (all type and LLINs), number of LLIN mosquito nets per household, and number of persons per LLIN members of household (all, U5, pregnant) who slept under a mosquito net last night (all type and LLIN) and the coverage of indoor residual spraying.

2.4 Measurement methods

Sex of children: Gender was recorded as male or female.

Birth date or age in months for children 0-59 months: The exact date of birth (day, month, year) was recorded from either an EPI card, child health card or birth notification if available. If no reliable proof of age was available, age was estimated in months using a local event calendar or by comparing the selected child with a sibling whose ages were known, and was recorded in months on the questionnaire.

Weight of children 6-59 months: Measurements were taken to the closest 100 grams using an electronic scale (SECA scale) with a wooden board to stabilise it on the ground.

Height/Length of children 6-59 months: Children's height or length was taken to the closest millimetre using a wooden height board. Height was used to decide on whether a child should measured lying down (length) or standing up (height).

Oedema in children 6 months-9 years: bilateral oedema was assessed by applying gentle thumb pressure on to the tops of both feet of the child for a period of three seconds and thereafter observing for the presence or absence of an indent.

MUAC of children 6 months-9 years and women 15-49 years: MUAC was measured at the mid-point of the left upper arm between the elbow and the shoulder and taken to the closest millimetre using a standard tape.

Child enrolment in selective feeding programme for children 6-59 months: Selective feeding programme coverage was assessed for the outpatient therapeutic programme and for the supplementary feeding programme using the direct method.

Haemoglobin concentration in children 6-59 months and women 15-49 years: Hb concentration was taken from a capillary blood sample from the fingertip and recorded to the closest gram per decilitre by using the portable HemoCue Hb 301 Analyser (HemoCue, Sweden). If severe anaemia was detected, the child or the woman was referred immediately.

Measles vaccination in children 6-59 months: Measles vaccination was assessed by checking for the measles vaccine on the EPI card if available or by asking the caregiver to recall if no EPI card was available.

Vitamin A supplementation in last 6 months in children 6-59 months: Whether the child received a vitamin A capsule over the past six months was recorded from the EPI card or health card if available or by asking the caregiver to recall if no card is available. A vitamin A capsule was shown to the caregiver when asked to recall.

Diarrhoea in last 2 weeks in children 0-59 months: Caregivers were asked if their child had suffered from diarrhoea in the past two weeks and were asked about the feeding practices during diarrhoea.

ANC enrolment and iron and folic acid pills coverage: If the surveyed woman was pregnant, it was assessed by card or recall whether she was enrolled in the ANC programme and was receiving iron-folic acid pills.

Infant and young child feeding practices in children 0-23 months: Infant and young child feeding practices were assessed based on standard WHO recommendations (WHO 2007).

Mosquito net coverage: variables were assessed using interviews with the head of household (male or female) or in their absence a responsible adult (preferably over the age of 18 years) and through direct observation of the mosquito nets in the household.

Referrals: for children 6-59 months, referrals to the health centre were made for those with a MUAC <12.5cm and for those with edema, and for children with Hb<7g/dl. For adult women, those with Hb<8g/dl were referred.

2.5 Case definitions, inclusion criteria and calculations

A household was defined as: a group of people who live together and routinely eat out of the same pot. Where two families share the same pot, they were assessed as one household even if they lived in the same compound.

Nutritional Status: Table 4 shows the definition and classification of the nutritional indicators used. Main results are reported according the WHO Growth Standards 2006.

Table 4. Definitions of acute malnutrition using weight-for-height and/or edema in children 6–59 months

Categories of acute malnutrition	Percentage of median (NCHS Growth Reference 1977 only)	Z-scores (NCHS Growth Reference 1977 and WHO Growth Standards 2006)	Bilateral oedema
Global acute malnutrition	<80%	< -2 z-scores	Yes/No
Moderate acute	<80% to ≥70%	< -2 z-scores and ≥ -3 z-	No

malnutrition		scores	
Severe acute malnutrition	>70%	> -3 z-scores	Yes
	<70%	< -3 z-scores	Yes/No

Stunting, also known as chronic malnutrition was defined using height-for-age index values and was classified as severe or moderate based on the cut-offs shown in Table 5. Main results are reported according to the WHO Growth Standards 2006.

Table 5. Definitions of stunting using height-for-age in children 6–59 months

Categories of stunting	Z-scores (WHO Growth Standards 2006 and NCHS Growth Reference 1977)
Stunting	<-2 z-scores
Moderate stunting	<-2 z-score and >=-3 z-score
Severe stunting	<-3 z-scores

Underweight was defined using the weight-for-age index values and was classified as severe or moderate based on the cut-offs shown in Table 6. Main results are reported according to the WHO Growth Standards 2006.

Table 6. Definitions of underweight using weight-for-age in children 6–59 months

Categories of underweight	Z-scores (WHO Growth Standards 2006 and NCHS Growth Reference 1977)
Underweight	<-2 z-scores
Moderate underweight	<-2 z-scores and >=-3 z-scores
Severe underweight	<-3 z-scores

Mid Upper Arm Circumference (MUAC) values in children 6-59 months were used to define malnutrition according to the cut-offs shown in Table 7.

Table 7. Classification of acute malnutrition based on MUAC in children 6-59 months (WHO)

Categories of Malnutrition	MUAC Reading
At risk of malnutrition	≥ 12.5 cm and <13.5 cm
Moderate malnutrition	≥ 11.5 cm and <12.5 cm
Severe malnutrition	< 11.5 cm

Infant and young child feeding practices in children 0-23 months: Infant and young child feeding practices were assessed as follows based on standard WHO recommendations (WHO 2007).

Timely initiation of breastfeeding: Proportion of children born in the last 24 months who were put to the breast within one hour of birth.

$$\frac{\text{Children born in the last 24 months who were put to the breast within one hour of birth}}{\text{Children born in the last 24 months}}$$

Exclusive breastfeeding under 6 months: Proportion of infants 0–5 months of age who are fed exclusively with breast milk.

Infants 0–5 months of age who received only breast milk during the previous day
Infants 0–5 months of age

Continued breastfeeding at 1 year: Proportion of children 12–15 months of age who are fed breast milk.

Children 12–15 months of age who received breast milk during the previous day
Children 12–15 months of age

Introduction of solid, semi-solid or soft foods: Proportion of infants 6–8 months of age who receive solid, semi-solid or soft foods.

Infants 6–8 months of age who received solid, semi-solid or soft foods during the previous day
Infants 6–8 months of age

Children ever breastfed: Proportion of children born in the last 24 months who were ever breastfed.

Children born in the last 24 months who were ever breastfed
Children born in the last 24 months

Continued breastfeeding at 2 years: Proportion of children 20–23 months of age who are fed breast milk.

Children 20–23 months of age who received breast milk during the previous day
Children 20–23 months of age

Bottle feeding: Proportion of children 0-23 months of age who are fed with a bottle

Children 0–23 months of age who were fed with a bottle during the previous day
Children 0–23 months of age

Consumption of iron-rich or iron-fortified foods: Proportion of children 6-23 months of age who received an Iron-rich food or Iron-fortified food that is specially designed for infant and young children or that is fortified in the home.

Children 6-23 months of age who received an Iron-rich food or Iron-fortified food that
Is specially designed for infant and young children, or that was fortified in the home with a

Product that included Iron during the previous day
Children 6-23 months of age

Diarrhoea: Three or more loose or watery stools in a 24-hour period.

Undernutrition in women of reproductive age: Mid Upper Arm circumference (MUAC) in women was classified according to cut-offs shown in Table 8.

Table 8. Classification of under nutrition based on MUAC in women of reproductive age (Kenya National Guidelines for integrated management of acute malnutrition, 2009)

Categories of Malnutrition	MUAC Reading
Pregnant and lactating women	
Moderate malnutrition	≥18.5 cm and <21 cm
Severe malnutrition	<18.5 cm
Non-pregnant, non-lactating	
Moderate malnutrition	≥16.0 cm and <18.5 cm
Severe malnutrition	<16.0 cm

Anemia was measured using a HemoCue Hb 301 machine and defined and categorised according to WHO recommended cut-offs shown in Table 9 to determine the prevalence of anemia.

Table 9. Definition of anemia (WHO 2000)

Age/Sex groups	Categories of Anaemia (Hb g/dL)			
	Total	Mild	Moderate	Severe
Children 6 - 59 months	<11.0	10.9 - 10.0	9.9 - 7.0	< 7.0
Non-pregnant adult females 15-49 years	<12.0	11.9 - 11.0	10.9 - 8.0	< 8.0

2.5 Classification of public health problems and targets

Anthropometry:

The classification of public health significance for anthropometric results for children aged 6-59 months is shown in Table 10.

Table 10. Classification of public health significance for children under 5 years of age (WHO 1995, 2000)

Prevalence %	Critical	Serious	Poor	Acceptable
Low weight-for-height	≥15	10-14	5-9	<5
Low height-for-age	≥40	30-39	20-29	<20
Low weight-for-age	≥30	20-29	10-19	<10

Measles vaccination

UNHCR recommends target coverage of 95% (same as Sphere Standards).

Vitamin A supplementation

UNHCR recommends vitamin A supplementation coverage to be >90% among children aged 6-59 months.

Anaemia

The thresholds for public health significance for anemia prevalence for all groups according to WHO, are displayed in Table 11. The Strategic Plan for Nutrition and Food Security (2008-2010) recommends that the prevalence of anemia for all groups must be low (5-19%).

Table 11. Classification of public health significance (WHO 2000)

Prevalence %	High	Medium	Low
Anaemia	≥40	20-39	5-19

WASH

Relevant UNHCR standards for WASH indicators are shown in Table 12.

Table 12. UNHCR WASH Programme Standards

UNHCR Standard	Indicator
Average quantity of water available per person/day	> or = 20 litres
Latrine provision	20 people/latrine

Mosquito net coverage

UNHCR recommends that >75% of households should have at least one LLIN, and a target of no more than 2 persons per LLIN to achieve universal coverage.

2.6 Training, coordination and supervision

Survey teams were trained for 5 days at Kassala conference hall, on 24 – 28 May 2015. The training covered the following topics: survey objectives; introduction to malnutrition; introduction to nutrition surveys; sampling and household selection; anthropometric measurements; anemia measurement; survey quality control; and interviewing skills. A total of 6 teams were involved in collecting data simultaneously in one camp each consisting of 4 team members (interviewer, anthropometric measurer, anthropometric assistant and hemoglobin measurer). The enumerators were trained for 5 days including a day for standardization test and pilot test. Data collection was conducted from 1 June to 18 June 2015 with coordination and supervision from UNHCR, COR, Human Appeal International (HAI), Sudanese Red Crescent (SRC) and Ministry of health (MOH).

2.7 Data analysis

Questionnaires were uploaded onto Smart Mobile which were used for data collection of household level indicators (WASH, Mosquito net use) and individual level indicators (sex, age, weight, height/length, edema, MUAC, Hb, child enrollment in feeding program, measles vaccination, Vitamin A supplementation, diarrhea in the last two weeks in children 6-59 months, and IYCF practices in children 0-23 months). Data was transferred to the offline server and exported to excel formats at the end of each day, followed by data cleaning and feedback to survey teams.

Data analysis was conducted using ENA for SMART, 21 April 2015 version for anthropometric data, and Epi info version 3.5.4 for the other data sets. SMART flags (+/-3 SD WHZ, HAZ, WAZ) were used for exclusion of outliers for anthropometric data.

3. RESULTS

3.1 Results from Shagarab Camps (Shagarab 1, 2, 3)

Anthropometric results

Anthropometric results (based on WHO standards 2006):

Definitions of acute malnutrition should be given (for example, global acute malnutrition is defined as <-2 z scores weight-for-height and/or oedema, severe acute malnutrition is defined as <-3z scores weight-for-height and/or oedema)

Exclusion of z-scores from Observed mean SMART flags: WHZ -3 to 3; HAZ -3 to 3; WAZ -3 to 3

Girls were 46.5% of the total sample, compared to 53.5% boys, giving an overall sex ratio of 0.8 1.2, which is within an acceptable range (Table 13).

Table 13. Distribution of age and sex of sample in Shagarab Camps, Sudan (June 2015)

	Boys		Girls		Total		Ratio
AGE (mo)	**no.**	**%**	**no.**	**%**	**no.**	**%**	**Boy: girl**
6-17	75	48.4	80	51.6	155	23.4	0.9
18-29	88	51.2	84	48.8	172	25.9	1.0
30-41	74	54.0	63	46.0	137	20.7	1.2
42-53	93	60.8	60	39.2	153	23.1	1.5
54-59	25	54.3	21	45.7	46	6.9	1.2
Total	355	53.5	308	46.5	663	100.0	1.2

Table 13: Population age and sex pyramid show an acceptable age ratio for boys and girls.

Using the WHZ indicator and edema, the calculated prevalence of Global Acute Malnutrition (GAM) was 17.3 % (14.5 - 20.4 95% C.I.)), with 3.1 % (2.0 - 4.8 95% C.I.) children having

Severe Acute Malnutrition (SAM) (Table 14)

Table 14. Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex – Shagarab Camps (June 2015)

	All n = 643	**Boys** n = 343	**Girls** n = 300
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(111) 17.3 % (14.5 - 20.4 95% C.I.)	(63) 18.4 % (14.6 - 22.8 95% C.I.)	(48) 16.0 % (12.3 - 20.6 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(91) 14.2 % (11.7 - 17.1 95% C.I.)	(48) 14.0 % (10.7 - 18.1 95% C.I.)	(43) 14.3 % (10.8 - 18.8 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(20) 3.1 % (2.0 - 4.8 95% C.I.)	(15) 4.4 % (2.7 - 7.1 95% C.I.)	(5) 1.7 % (0.7 - 3.8 95% C.I.)

Comparison with results from 2013 shows a slight increase in GAM and SAM among children 6-59 months but not statistically significant. (Figure 3)

Figure 3. Nutrition survey (GAM, SAM) results since 2010 – Shagarab Camps, East Sudan (June 2015)

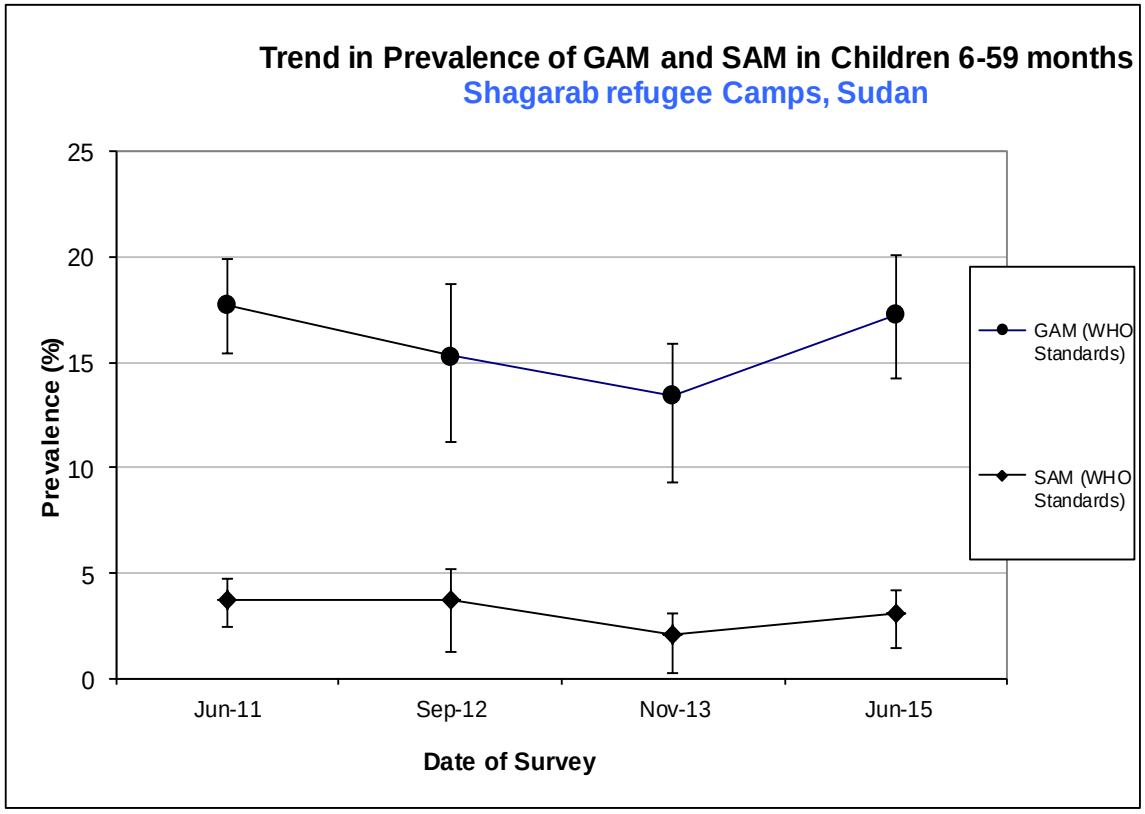


Table 15 show the analysis by age group revealed that acute malnutrition was highest in the 6 -17 months age group.

Table 15. Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema

		Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	149	8	5.4	28	18.8	113	75.8	0	0.0
18-29	168	3	1.8	27	16.1	138	82.1	0	0.0
30-41	134	3	2.2	15	11.2	116	86.6	0	0.0
42-53	150	4	2.7	16	10.7	130	86.7	0	0.0
54-59	42	2	4.8	5	11.9	35	83.3	0	0.0
Total	643	20	3.1	91	14.2	532	82.7	0	0.0

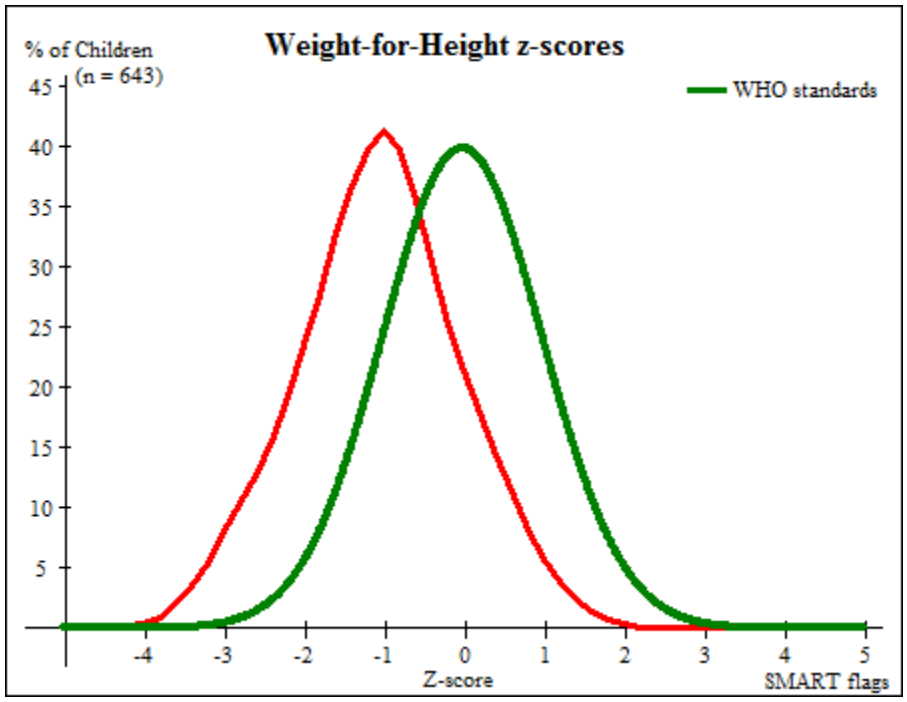
Table 16. Distribution of acute malnutrition and oedema based on weight-for-height z-scores

	<-3 z-score	**>=-3 z-score**
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 27 (4.1 %)	Not severely malnourished No. 631 (95.9 %)

Table 16 Show the prevalence of oedema is 0.0 %

Comparison of the WHZ distribution curves for the survey and WHO is shown in Figure 4. The survey curve is positioned to the left of the WHO curve, indicating a higher prevalence of acute malnutrition than the reference population. The mean±SD of WHZ (n=643) : -1.06±1.00. **(**Figure 4)

Figure 4. Distribution of weight-for-height z-scores (based on WHO Growth Standards; the reference population is shown in green) of survey population compared to reference population- Shagarab Camps, East Sudan, (June 2015)



The prevalence of chronic malnutrition was 57.9 % (54.0 - 61.7 95% C.I.) with a severe stunting prevalence of 1.3% (0.4-3.6 95% C.I). The prevalence of chronic malnutrition is within the “acceptable” category of WHO severity classification (Table 16)

Table 17. Prevalence of stunting based on height-for-age z-scores and by sex – Shagarab Camps (June 2015)

	All n = 625	**Boys** n = 333	**Girls** n = 292
Prevalence of stunting (<-2 z-score)	(362) 57.9 % (54.0 - 61.7 95% C.I.)	(197) 59.2 % (53.8 - 64.3 95% C.I.)	(165) 56.5 % (50.8 - 62.1 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(225) 36.0 % (32.3 - 39.8 95% C.I.)	(117) 35.1 % (30.2 - 40.4 95% C.I.)	(108) 37.0 % (31.7 - 42.7 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(137) 21.9 % (18.9 - 25.3 95% C.I.)	(80) 24.0 % (19.7 - 28.9 95% C.I.)	(57) 19.5 % (15.4 - 24.5 95% C.I.)

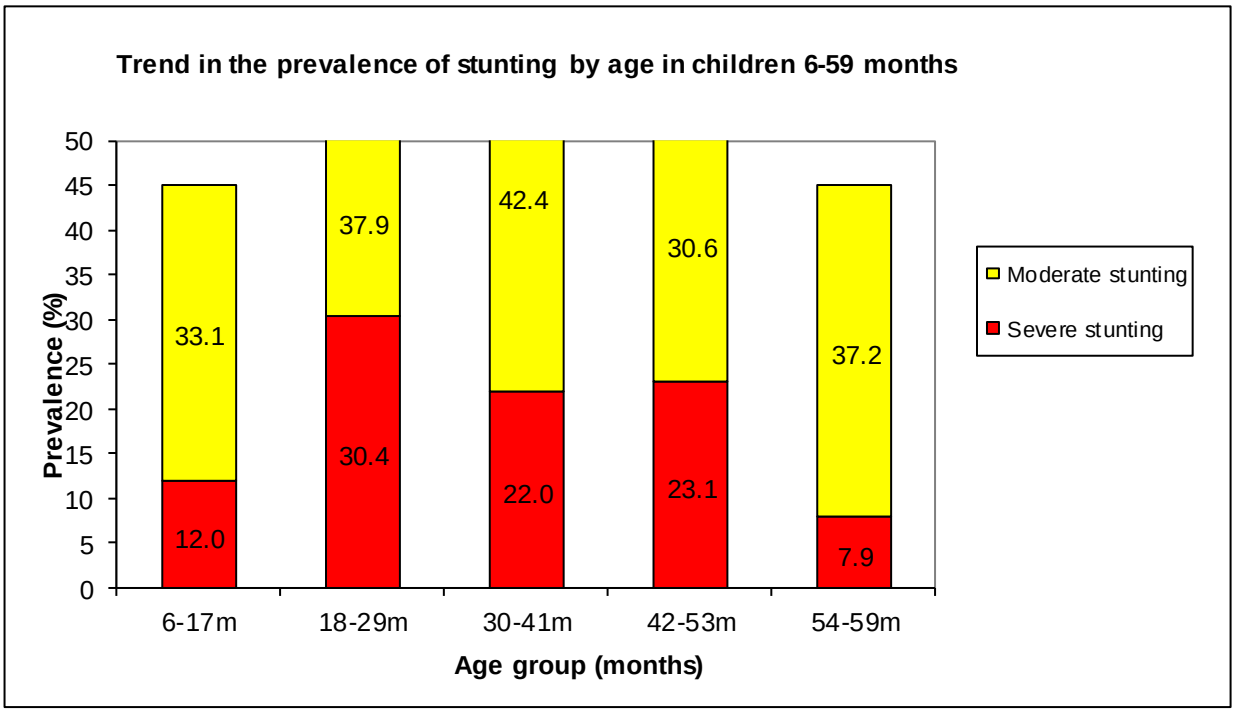
Children in the age groups 18-29 and 30-41 months tend to be the most affected by stunting as compared to the other age groups. (Table 17)

Table 18. Prevalence of stunting by age based on height-for-age z-scores in Shagarab camps

		Severe stunting (<-3 z-score)		**Moderate stunting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	142	17	12.0	47	33.1	78	54.9
18-29	161	49	30.4	61	37.9	51	31.7
30-41	132	29	22.0	56	42.4	47	35.6
42-53	147	34	23.1	45	30.6	68	46.3
54-59	43	8	18.6	16	37.2	19	44.2
Total	625	137	21.9	225	36.0	263	42.1

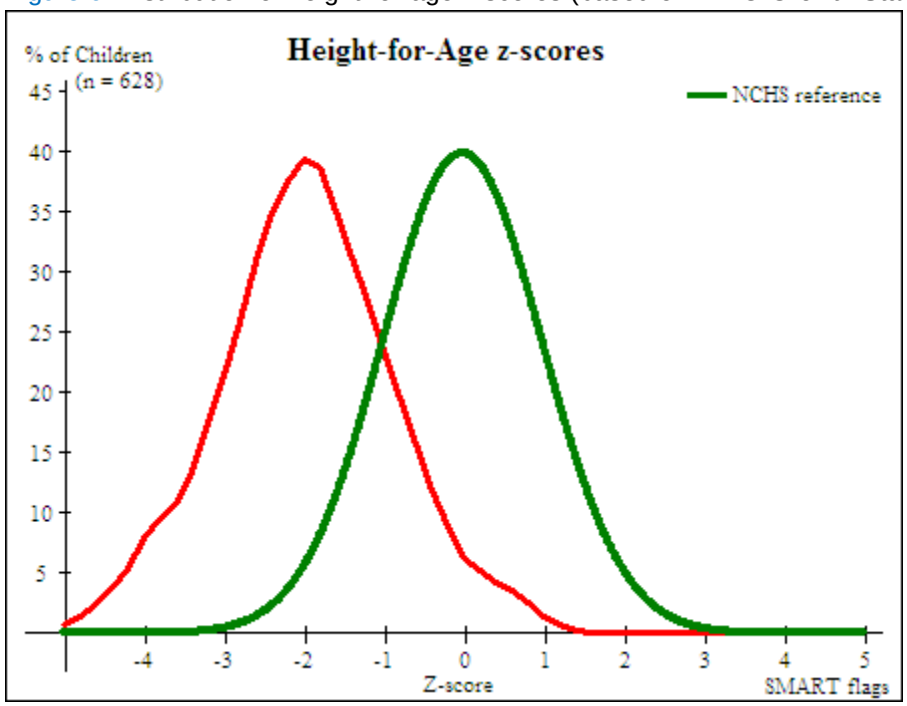
Children in the age groups 18-29 and 30-41 months tend to be the most affected by stunting as compared to the other age groups. (Figure 5)

Figure 5. Trends in the prevalence of stunting by age in children 6-59 months- Shagarab camps, East Sudan (June 2015)



The comparison of the survey and WHO standard HAZ distribution showed that the survey Population had a higher prevalence of stunting than the reference population to the left of the WHO curve. (Figure 6)

Figure 6. Distribution of height-for-age z-scores (based on WHO Growth Standards)



Underweight in children 6-59 months (WHO 2006 Growth Standards)

The proportion of children who were underweight was 7.4 % (5.7- 9.7 95% C.I.) with 2.3 %(1.4- 3.7 95% C.I.) Severely underweight (Table 18)

Table 19. The proportion of children who were underweight in Shagarab Camps (June 2015)

	All **n = 659**	**Boys** **n = 354**	**Girls** **n = 305**
Prevalence of global malnutrition (< 125 mm and/or oedema)	(49) 7.4 % (5.7- 9.7 95% C.I.)	(24) 6.8 % (4.6 - 9.9 95% C.I.)	(25) 8.2 % (5.6 - 11.8 95% C.I.)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	(34) 5.2 % (3.7- 7.1 95% C.I.)	(20) 5.6 % (3.7 - 8.6 95% C.I.)	(14) 4.6 % (2.8 - 7.6 95% C.I.)
Prevalence of severe malnutrition (< 115 mm and/or oedema)	(15) 2.3 % (1.4- 3.7 95% C.I.)	(4) 1.1 % (0.4 - 2.9 95% C.I.)	(11) 3.6 % (2.0 - 6.3 95% C.I.)

MUAC in children 6-59 months

The prevalence of severe wasting < 115 mm and >=115 mm and < 125 mm was high in 6 - 17 years. (Table 19)

Table 20. Prevalence of acute malnutrition by age, based on MUAC cut off's and/or oedema

		Severe wasting (< 115 mm)		**Moderate wasting (>= 115 mm and < 125 mm)**		**Normal (> = 125 mm)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	153	10	6.5	23	15.0	120	78.4	0	0.0
18-29	171	4	2.3	9	5.3	158	92.4	0	0.0
30-41	136	0	0.0	2	1.5	134	98.5	0	0.0
42-53	153	1	0.7	0	0.0	152	99.3	0	0.0
54-59	46	0	0.0	0	0.0	46	100.0	0	0.0
Total	659	15	2.3	34	5.2	610	92.6	0	0.0

The prevalence of underweight (<-2 z-score) based on weight-for-age z-scores is 48.7 % (44.9 - 52.5 95% C.I.) and Prevalence of severe underweight (<-3 z-score) is 15.0 % (12.4 - 17.9 95% C.I.) (Table 20)

Table 21. Prevalence of underweight based on weight-for-age z-scores by sex in Shagarab Camps, (June 2015)

	All	**Boys**	**Girls**

	n = 647	n = 346	n = 301
Prevalence of underweight (<-2 z-score)	(315) 48.7 % (44.9 - 52.5 95% C.I.)	(169) 48.8 % (43.6 - 54.1 95% C.I.)	(146) 48.5 % (42.9 - 54.1 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(218) 33.7 % (30.2 - 37.4 95% C.I.)	(120) 34.7 % (29.9 - 39.8 95% C.I.)	(98) 32.6 % (27.5 - 38.0 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(97) 15.0 % (12.4 - 17.9 95% C.I.)	(49) 14.2 % (10.9 - 18.2 95% C.I.)	(48) 15.9 % (12.2 - 20.5 95% C.I.)

The analysis by age group revealed that acute malnutrition was highest in the 54-59 months age group and generally increased with age (Table 21).

Table 22. Prevalence of underweight by age, based on weight-for-age z-scores in Shagarab (June **2015)**

		Severe underweight (<-3 z-score)		**Moderate underweight (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	150	27	18.0	44	29.3	79	52.7	0	0.0
18-29	164	24	14.6	66	40.2	74	45.1	0	0.0
30-41	135	23	17.0	39	28.9	73	54.1	0	0.0
42-53	152	14	9.2	51	33.6	87	57.2	0	0.0
54-59	46	9	19.6	18	39.1	19	41.3	0	0.0
Total	647	97	15.0	218	33.7	332	51.3	0	0.0

Table 21: shows the prevalence of underweight by age, based on weight-for-age z-scores.

Table 23. Prevalence of overweight based on weight for height cut off's and by sex (no oedema)

	All n = 643	**Boys n = 343**	**Girls n = 300**
Prevalence of overweight (WHZ > 2)	(0) 0.0 % (0.0 - 0.6 95% C.I.)	(0) 0.0 % (0.0 - 1.1 95% C.I.)	(0) 0.0 % (0.0 - 1.3 95% C.I.)
Prevalence of severe overweight (WHZ > 3)	(0) 0.0 % (0.0 - 0.6 95% C.I.)	(0) 0.0 % (0.0 - 1.1 95% C.I.)	(0) 0.0 % (0.0 - 1.3 95% C.I.)

Table 24. Prevalence of overweight by age, based on weight for height (no oedema)

		Overweight (WHZ > 2)		Severe Overweight (WHZ > 3)	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**
6-17	149	0	0.0	0	0.0
18-29	168	0	0.0	0	0.0
30-41	134	0	0.0	0	0.0
42-53	150	0	0.0	0	0.0
54-59	42	0	0.0	0	0.0
Total	643	0	0.0	0	0.0

Table 24. shows mean z-scores and standard deviations for the three main indicators of nutritional status. The mean z-score for Weight-for-height was in the SMART recommended range of 0.8-1.2.

Table 25. Mean z-scores, Design Effects and excluded subjects

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	643	-1.06±1.00	1.00	47	15
Weight-for-Age	647	-1.97±0.99	1.00	46	12
Height-for-Age	625	-2.18±1.09	1.00	47	33

***** contains for WHZ and WAZ the children with edema

Anaemia results

The prevalence of anemia for children 6-59 months by category of severity is contained in Table 26 and Figure 7. The total prevalence of anemia (<11g/dL) was 53.2 (47.6 – 58 95% C.I), which is in the “high” prevalence classification of WHO. Of the sample, 2.4% (0.7 – 6.0 95% C.I) were severely anemic (<7g/dl) and were referred to the camp clinic for treatment. (Table 25)

Table 26. Prevalence of and hemoglobin concentration in children 6-59 months of age – Shagarab camps, (June 215)

Anaemia – Children 6-59 months	**All** n = 643
Total Anaemia (Hb<11.0 g/dL)	53.2 (47.6 – 58)
Mild Anemia (Hb 10.0-10.9 g/dL)	25.7 (19.3 – 33.1)
Moderate Anaemia (7.0-9.9 g/dL)	15.0 (9.9 - 21.3)
Severe Anaemia (<7.0 g/dL)	2.4 (0.7 – 6.0)

Figure 7. Nutrition survey results (anemia in children 6-59 months) since 2010 – Shagarab Camps, Sudan, and (June 2015)

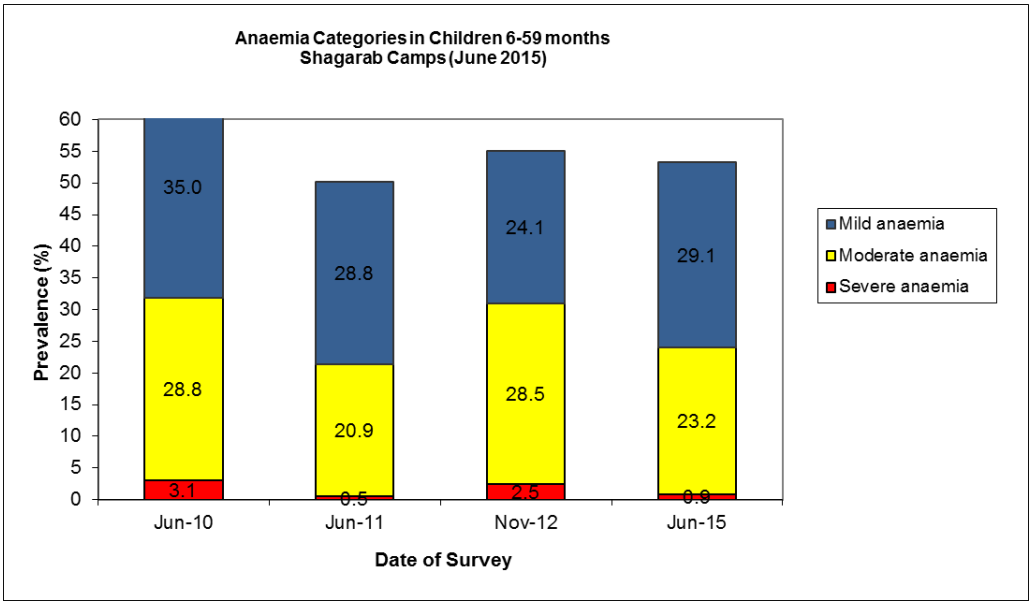


Figure 7 Comparison with results from 2010 to 2015 prevalence of anaemia. The prevalence of anaemia slightly decline from 57% to 53 among children 6-59 months

Anemia was highest in the 6-23 months age group and decreased with age, a finding which has been observed in similar contexts in recent surveys. (Table 26)

Table 27. Prevalence of anemia by age- Shagarab camps, Sudan (June 2015)

		Severe Anaemia (<7.0 g/dL)		**Moderate Anaemia (7.0-9.9 g/dL)**		**Mild Anaemia (Hb 10.0-10.9 g/dL)**		**Total Anaemia (Hb<11g.0 g/dL)**		**Normal (Hb≥11.0 g/dL)**	
Age (mths)	**Total no.**	**No.**	**%** (95% CI)	**No.**	**%** (95% CI)	**No.**	**%** (95% CI)	**No.**	**%** (95% CI)	**No.**	**%** (95% CI)
6-23	118	0	0 (0.0 – 3.1)	29	24.6 (17.1-33.4)	38	32.2 (23 -41.4)	67	56 (37.9-60.9)	75	43.2 (34.1-52.7)
24-35	79	1	1.3 (0-0 -6.9)	14	17.70 (10.0-27.9)	25	31.6 (21.6-43.1)	40	51.1 (38.4-63.8)	39	50.6 (37.92-60.9)
36-59	130	2	1.5 (0.2-5.4)	33	25.4 (18.2-33.8)	32	24.6 (17.5-3.9)	67	51 (42.6-60.4)	63	48.5 (39.6-57.4)
Total	**327**	3	0.9 (0-2-2.9)	76	23.2 (18.8-28.3)	95	29.1 (24.3-34.4)	174	53 (47.6-58.7)	153	46.8 (41.3-52.4)

Programme enrolment

Prevalence of Supplementary feeding programme enrolment according to WHZ+MUAC is 34.0 % (24.9 - 44.0 95% CI) whilst Therapeutic feeding programme enrolments is 30.6 % (16.3 - 48.1 95% C.I.) (Table 28)

Table 28. Prevalence of programme enrolment in Shagarab camps, (June2015)

Programme type	WHZ+MUAC	MUAC only
Supplementary feeding programme coverage	34.0 % (24.9 - 44.0 95% CI)	46.7% (21.3 -73.4)
Therapeutic feeding programme coverage	30.6 % (16.3 - 48.1 95% C.I.)	50.0% (32.4 -67.6)

Vaccination and supplementation

Of the eligible children 9-59 months, 96.8 % (95.1 – 98.0. 95% CI) had been vaccinated against measles, which is above the UNHCR target of 95%. (Table 29)

Measles vaccination coverage

Table 29. Measles vaccination coverage for children aged 9-59 months (n=661) – Shagarab camps, Sudan (June 2015)

	Measles (with card) n= 549	**Measles (with card and confirmation from mother) n= 640**
YES	83.1% (79.9 - 85.8 95% CI)	96.8 % (95.1 – 98.0. 95% CI)

Table 29: show the coverage of Measles vaccination (with card and confirmation from mother card was found to be low at 96.8 % (95.1 – 98.0. 95% CI)

Vitamin A supplementation coverage results

Within the 6-59 months group, 0.8 % (0.3 – 1.9 95% CI) had received Vitamin A supplementation in the preceding 6 months, with 4. 5. % (3.1 – 6.5 95% CI) with confirmation from cards. The proportion of children who had received Vitamin A supplementation is below the UNHCR target of >90% (Table 30**).**

Table 30. Vitamin A supplementation for children aged 6-59 months within past 6 months (n= 665) - Shagarab camps, Sudan (June 2015)

	Vitamin A capsule (with card) n=30	**Vitamin A capsule (with card or confirmation from mother) n=5**
YES	0.8 % (0.3 – 1.9 95% CI)	4. 5. % (3.1 – 6.5 95% CI)

Diarrhea results

Of the sampled children 6-59 months, 13.5% (10.6 -15.9 95% CI) reported having

experienced diarrhea in the preceding 2 weeks (Table 31).

Table 31: Prevalence of reported diarrhea in the two weeks prior to the interview - Shagarb camp, Sudan (June2015)

	Number/total	**% (95% CI)**
Diarrhoea in past 2 weeks	86/661	13.5 (10.6 -15.9 95% CI)

Infant and Young Child Feeding practices in children 0-23

99.2% (97.1- 99.9 95% C.I) of the sample aged 0-23 months had been introduced to breast milk within the first hour of birth. The rate of exclusive breastfeeding for children below 6 months of age was 50% (33.8 – 66.2 95% C.I). 94.7%, (82.3 - 99.4 95% C.I) of children between 12 -15 months continued breast feeding up to 1 year. 40.5 (24.8 - 57.9) 20 -23 months continued breast feeding up to 2 years. Third of 6 and 8 months had been introduced to solid foods. About a fifth 25.8%, (19.2 - 3.3 95% C.I) of children 6-23 months had consumed iron-rich foods. The proportion of infants and young children who had been bottle-fed was very low 2.4%, (0.9 - 5.2 95% C.I). 14.6% minimum dietary diversity, 16.6% minimum frequency diet, and 3.8% minimum acceptable diet. (Table 32)

Table 32. Prevalence of Infant and Young Child Feeding Practices indicators- Shagarb camp, Sudan (June2015)

Indicator	**Age range**	**Number/total**	**(%)**	95% CI
Early initiation of breastfeeding	0-23 months	244/246	99.2	(97.1- 99.9)
Exclusive breastfeeding under 6 months	0-5 months	20/40	50	(33.8 – 66.2)
Continued breastfeeding at 1 year	12-15 months	36/38	94.7	(82.3 - 99.4)
Continued breastfeeding at 2 years	20-23 months	34/49	69.4	(54.6 - 81.7)
Introduction of solid, semi-solid or soft foods	6-8 months	15/37	40.5	(24.8 - 57.9)
Children bottle fed	0-23 months	6/247	2.4	(0.9 - 5.2)
Consumption of iron-rich or iron-fortified foods	6-23 months	41/159	25.8	(19.2 - 3.3)
Minimum dietary diversity	6-23 months	36/247	14.6	(10.4 -19.6)
Minimum meal frequency	6-23 months	41/247	16.6	12.2 - 21.8
Minimum acceptable diet	6-23 months	7/184	3.8	(1.5 -7.7)
Consumption of FBF++ (Super cereal plus)	6-23 months	41/159	25.8	(19.2 -33.3)
Consumption LNS	6-23 months	41/159	22.6	16.4 -29.9)

Table 32 shows the results from analysis of feeding practices for the 0-23 age group.

Women Anaemia and Programme Enrolment

A total of 386 women aged 15-49 years were surveyed. Of these, 12.0% were pregnant. The mean age was 28 and ranged from 15 to 49 (Table 3.20).

Table 33. Women physiological status and age - Shagrab camps, Sudan (June 2015)

Physiological status	Number/total	% of sample
Non-pregnant	318	86
Pregnant	68	18.5
Mean age in years (range)	28.6 (15-49)	

Table 34. Prevalence of anemia and hemoglobin concentration in non-pregnant women of reproductive age (15-49 years) – Shagrab camps, Sudan (June 2015)

Anaemia – Non-pregnant women of reproductive age 15-49 years	**All** n = 318
Total Anaemia (<12.0 g/dL)	(102) 32.1% (27.0 -37.6.9 95% CI)
Mild Anaemia (11.0-11.9 g/dL)	(44)13.8% (10.3-18.2 95% CI)
Moderate Anaemia (8.0-10.9 g/dL)	(55) 17.3 % (13.4-22.0 95% CI)
Severe Anaemia (<8.0 g/dL)	(3) 0.9% (0.2-3.0 95% CI)
Mean Hb (g/dL)	12.3g/dL SD 1.5

Table 34 show the prevalence of anemia was 32.1% (27.0 -37.6.9 95% CI) which is acceptable.

ANC enrolment and iron-folic acid supplementation coverage

Table 35. ANC enrolment and iron-folic acid pills coverage among pregnant women (15-49 years) - Shagrab camps, Sudan (June 2015)

	Number/total	% (95% CI)
Currently enrolled in ANC programme	55/68	80.9 (69.5 - 89.4)
Currently receiving iron-folic acid pills	55/68	80.9 (69.5 - 89.4)

The prevalence of severe anemia among pregnant women was 8.8% (3.3 -18.2 95% CI), moderate anaemia 14.7% (7.3 -25.4 95% CI) and normal anaemia 70% (66.0 - 73.7) (Table 11)

Table 36. MUAC prevalence among pregnant women - Shagrab camps, Sudan (June 2015)

	Number/total	% (95% CI)
Anaemia (MUAC<21.0)	10/68	14.7 (7.3 -25.4)
Normal (MUAC> 21.0 cm	52/68	76 (64.6 - 85.9)

Wash Coverage

Wash, Shagarab Camps, Sudan, (June 2015)

Table 38 shows the different indicators and the total number of households who were sampled for each household-level indicator.

Table 38. Target sample size and actual number captured during the survey- Shagarb Camps, Sudan (June 2011)

Indicator	Target sample size	Household interviewed during the study	% of the target
WASH	350	347	99.1

Water, Sanitation and Hygiene- Shagarab Camps, Sudan (June 2015)

Table 39. Water Quality- Shagarab camps, Sudan (June 2015)

	Number/total	% (95% CI)
Proportion of households using an improved drinking water source	230/345	66.7 (61.4 - 71.6))
Proportion of households that use a covered or narrow necked container for storing their drinking water	24934/344	72.4 (67.3 - 77.0)

The mean litres of water per person per day were found to be 23.2; SD 18.6 and 51.6% (46.2 - 57.0 95% C.I) were meeting the UNHCR target of ≥20 lpppd. (Table 40)

Table 40. Water Quantity 1: Amount of litres of water used per person per day- Shagarab camps, Sudan (June 2015)

Proportion of households that access:	Number/total	% (95% CI)
≥ 20 litres	178/345	51.6 (46.2 - 57.0)
15 – <20 litres	113/345	15.7 (12.1 - 20.0)
10-<15 litres	54/345	32.8 (27.9 - 38.0

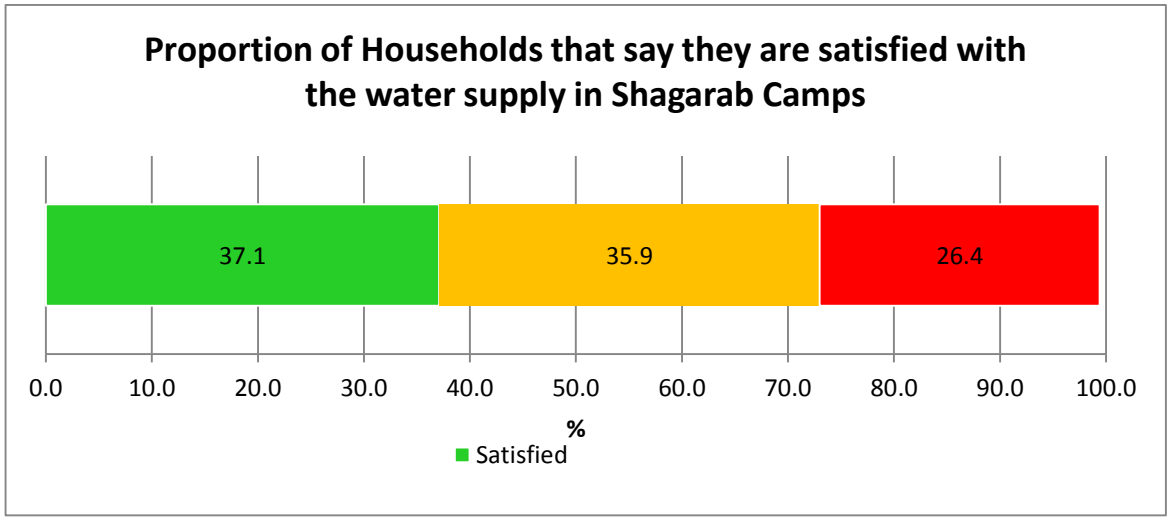
Average lpppd=23.2

Interestingly, only 37% (32.0 - 42.5, 95% C.I) of households were satisfied with the drinking water source (Table 41 and Figure **8**).

Table 41. Satisfaction with water supply- Shagrab camps, Sudan (June 2015))

	Number/total	% (95% CI)
Proportion of households that say they are satisfied with the drinking water supply	128/345	37.1(32.0 - 42.5)

Figure 8.

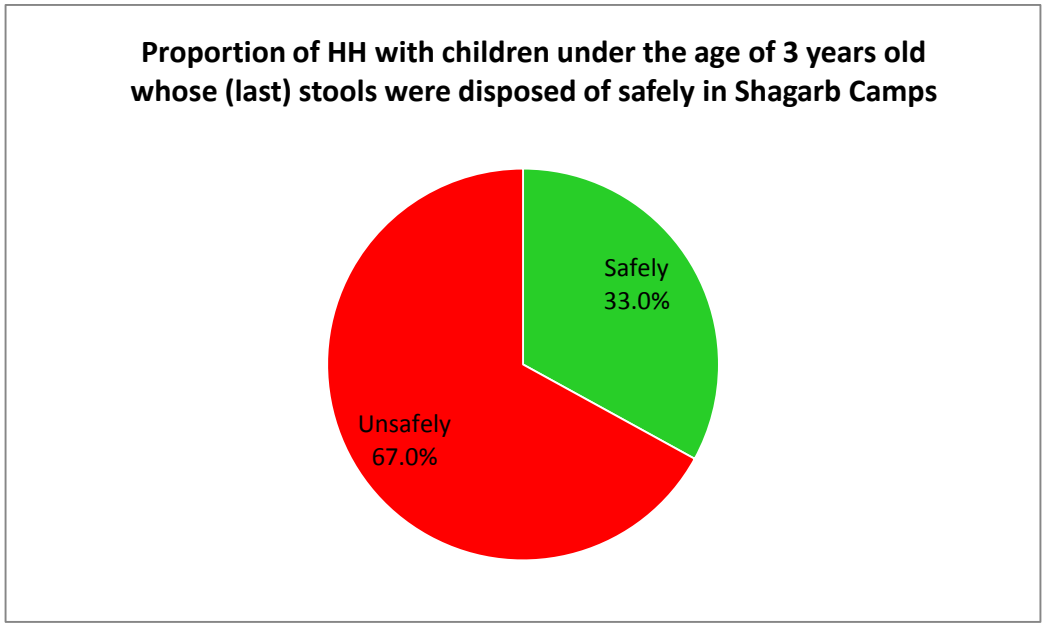


A very low proportion of households 17.2% (13.4 - 21.6, 95% C.I) were using an improved excreta disposal facility, with more than 77.6 (72.8 - 81.9 95% C.I) using unimproved toilets and The remainder 17.2% (13.4 - 21.6 95% CI) were using shared family and communal toilets (Table 42.and Figure 9)

Table 42. Safe Excreta disposal- Shagarab camps, Sudan (June 2015)

	Number/total	% (95% CI)
Proportion of households using an improved excreta disposal facility (improved toilet facility, not shared)	59/344	17.2 (13.4 - 21.6)
Proportion of households using a shared family toilet	8/344	2.3 (1.1 - 4.7)
Proportion of households using a communal toilet	10/344	2.9 (1.5 - 5.5)
Proportion of households using an unimproved toilet	267/344	77.6 (72.8 - 81.9)
The proportion of households with children under three years old that dispose of faeces safely.	60/182	33.0 (26.2 -40.3)

Figure 9.



Mosquito Net Coverage

350 of the planned 350 households were surveyed for the mosquito net coverage module, representing 90% **(Table 43).**

Table 43. Mosquito net coverage information

Household data	Planned	Actual	% of target
Total households surveyed for mosquito net coverage	350	350	100

30.6 (25.0 - 34.8 95% C.I) of households owned at least one mosquito net of any type, whilst only 2.3 (1.1 - 4.7 95% C.I) owned at least one LLIN, which is considerably lower than the UNHCR target of >80% (Table 44, Figure 10 and 11).

Table 44. Household Mosquito net ownership

	Number/total	% (95% CI)
Proportion of households owning at least one mosquito net of any type	104/315	30.6 (25.0 - 34.8)
Proportion of households owning at least one LLIN	22/215	2.3 (1.1 - 4.7)

Figure 10. Household ownership of at least one mosquito net

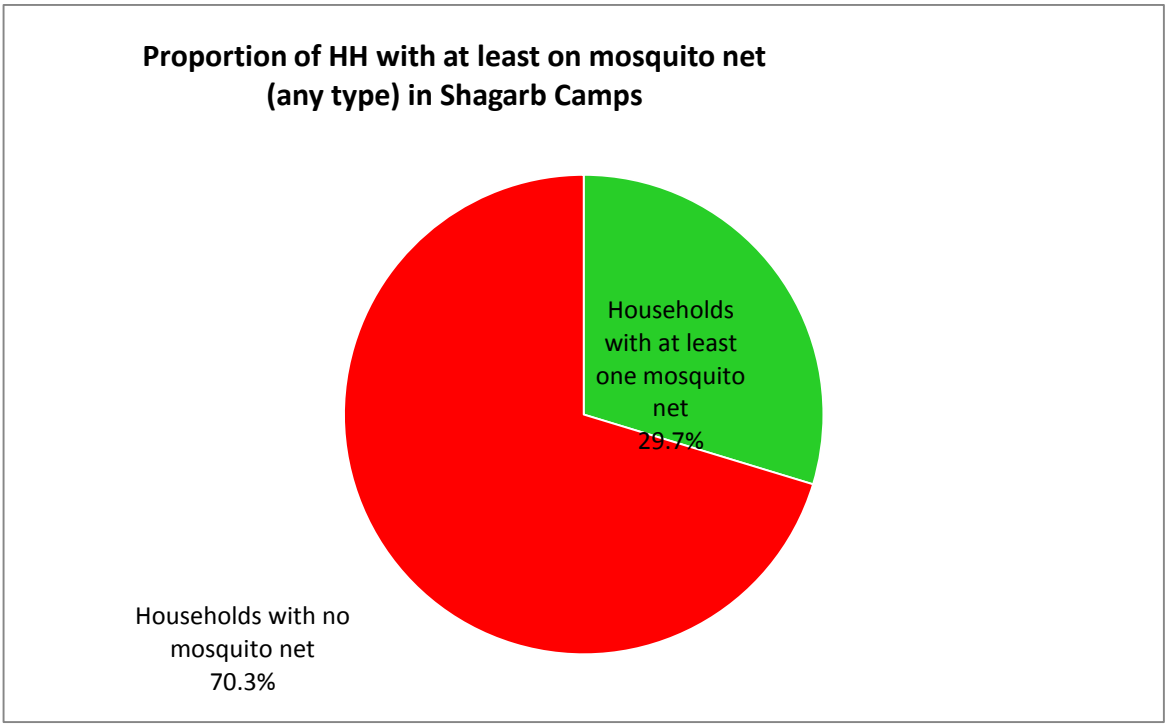
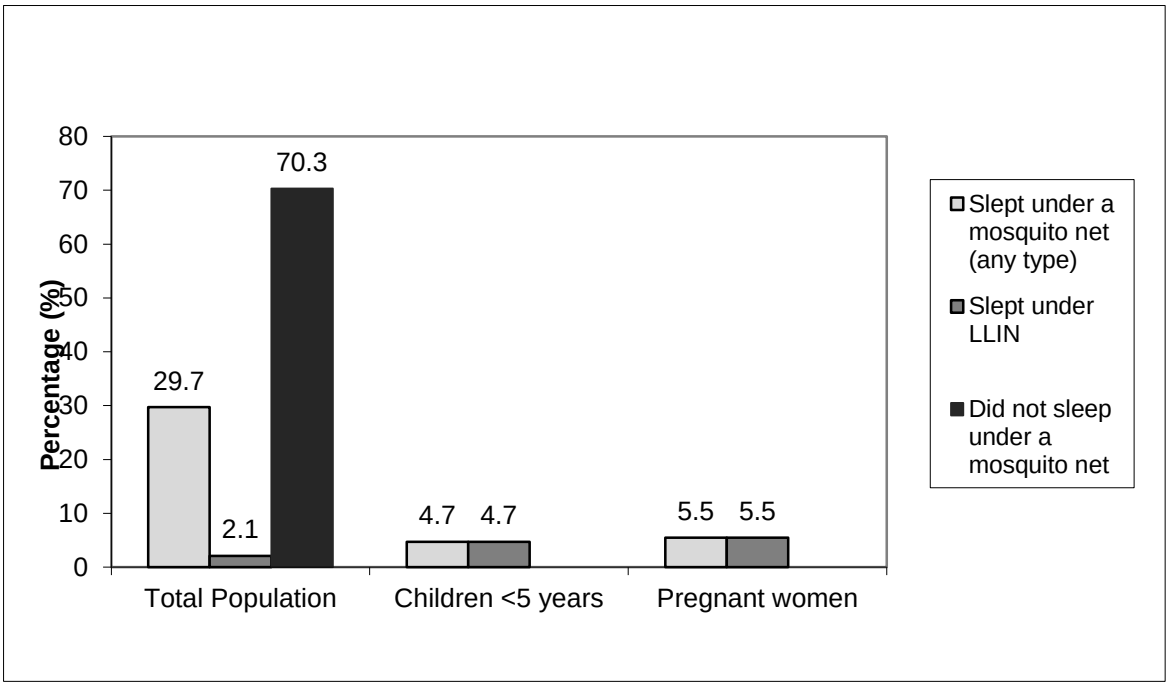


Figure 11).



Looking at utilization, 29.7% of the population had slept under a mosquito net and 2.1% under LLINs, with 4.7 of children having slept under LLINs and 5.5 of pregnant woman slept under LLINs (**Figure 11)**

3.2 Results from Land Based Camps (Um Gargour, Abuda and Fau 5)

Anthropometric results

Anthropometric results (based on WHO standards 2006):

Definitions of acute malnutrition should be given (for example, global acute malnutrition is defined as <-2 z scores weight-for-height and/or oedema, severe acute malnutrition is defined as <-3z scores weight-for-height and/or oedema)

Exclusion of z-scores from Observed mean SMART flags: WHZ -3 to 3; HAZ -3 to 3; WAZ -3 to 3

Girls were 49.9% of the total sample, compared to 50.1% boys, giving an overall sex ratio of 0.8 1.2, which is within an acceptable range (Table 45).

Table 45. Distribution of age and sex of sample – Land based camp, Sudan. (June 215)

	Boys		Girls		Total		Ratio
AGE (mo)	**no.**	**%**	**no.**	**%**	**no.**	**%**	**Boy: girl**
6-17	43	45.7	51	54.3	94	23.0	0.8
18-29	43	46.2	50	53.8	93	22.7	0.9
30-41	37	43.0	49	57.0	86	21.0	0.8
42-53	60	62.5	36	37.5	96	23.5	1.7
54-59	22	55.0	18	45.0	40	9.8	1.2
Total	205	50.1	204	49.9	409	100.0	1.0

Table 45: Population age and sex pyramid show an acceptable age ratio for boys and girls.

Using the WHZ indicator and edema, the calculated prevalence of Global Acute Malnutrition (GAM) was 9.5 % (7.0 - 12.8 95% C.I.) with 0.8 % (0.3 - 2.2 95% C.I.) children having Severe Acute Malnutrition (SAM). The GAM prevalence is within the “acceptable” category according to WHO classification (Table 46).

Table 46. Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

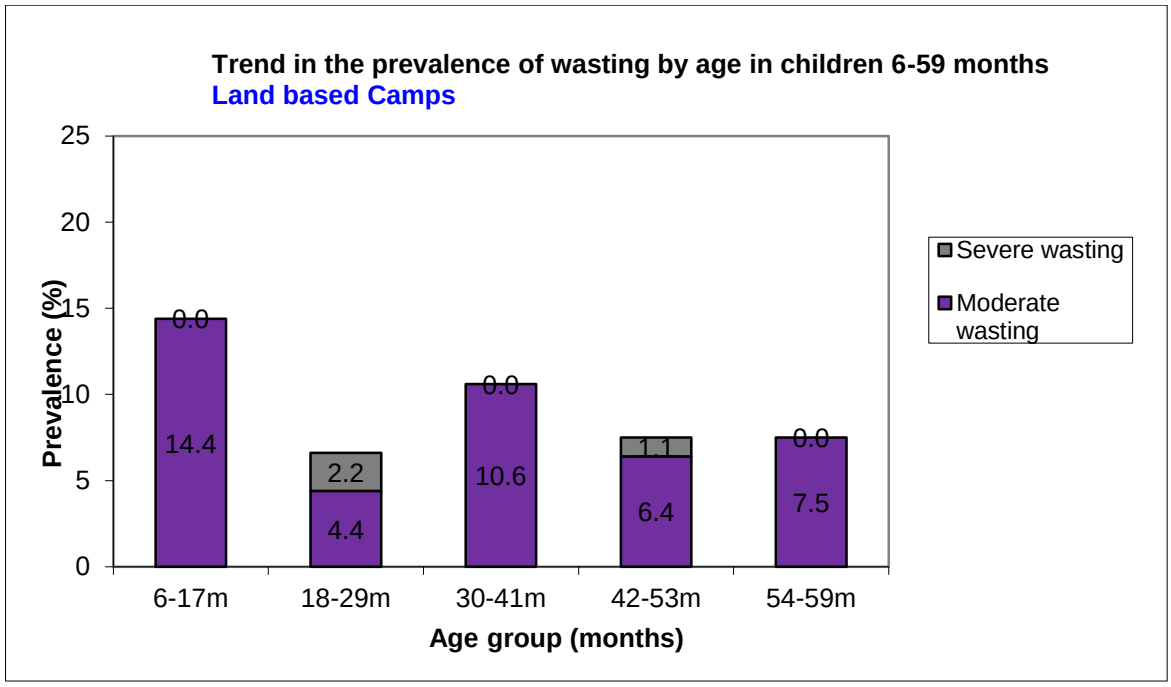
	All n = 400	**Boys** n = 201	**Girls** n = 199
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(38) 9.5 % (7.0 - 12.8 95% C.I.)	(23) 11.4 % (7.7 - 16.6 95% C.I.)	(15) 7.5 % (4.6 - 12.1 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(35) 8.8 % (6.4 - 11.9 95% C.I.)	(20) 10.0 % (6.5 - 14.9 95% C.I.)	(15) 7.5 % (4.6 - 12.1 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(3) 0.8 % (0.3 - 2.2 95% C.I.)	(3) 1.5 % (0.5 - 4.3 95% C.I.)	(0) 0.0 % (0.0 - 1.9 95% C.I.)

The analysis by age group revealed that acute malnutrition was highest in the 6 -17 months age group and generally increased with age (Table 47 and Figure 12).

Table 47. Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema – Land based Camps

		Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	90	0	0.0	13	14.4	77	85.6	0	0.0
18-29	91	2	2.2	4	4.4	85	93.4	0	0.0
30-41	85	0	0.0	9	10.6	76	89.4	0	0.0
42-53	94	1	1.1	6	6.4	87	92.6	0	0.0
54-59	40	0	0.0	3	7.5	37	92.5	0	0.0
Total	400	3	0.8	35	8.8	362	90.5	0	0.0

Figure 12.



A comparison of the WHZ distribution curves for the survey and WHO is shown in Figure 13.The survey curve is positioned to the left of the WHO curve, indicating a lower prevalence of acute malnutrition than the reference population with means of WHZ (n=400): -0.81±0.95. Figure (13)

Figure 13.

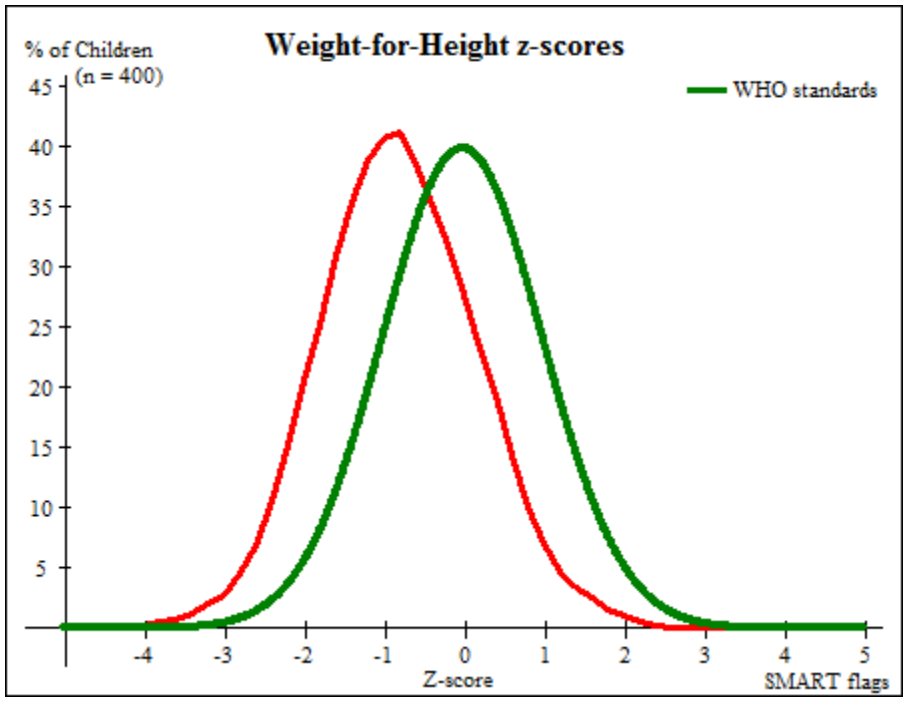


Table 48. Distribution of acute malnutrition and oedema based on weight-for-height z-scores – land based Camps

	<-3 z-score	**>=-3 z-score**
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 6 (1.5 %)	Not severely malnourished No. 402 (98.5 %)

The prevalence of oedema is 0.0 %

The prevalence of global malnutrition <125 mm and/or edema was 6.2 % (4.2 - 8.9 95% C.I.) and Prevalence of severe malnutrition (< 115 mm and/or oedema) was 0.7 % (0.3 - 2.1 95% C.I.) (Table 49).

Table 49. Prevalence of acute malnutrition based on MUAC cut off's (and/or oedema) and by sex

	All n = 406	**Boys** n = 202	**Girls** n = 204
Prevalence of global malnutrition (< 125 mm and/or oedema)	(25) 6.2 % (4.2 - 8.9 95% C.I.)	(11) 5.4 % (3.1 - 9.5 95% C.I.)	(14) 6.9 % (4.1 - 11.2 95% C.I.)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	(22) 5.4 % (3.6 - 8.1 95% C.I.)	(10) 5.0 % (2.7 - 8.9 95% C.I.)	(12) 5.9 % (3.4 - 10.0 95% C.I.)

Prevalence of severe malnutrition (< 115 mm and/or oedema)	(3) 0.7 % (0.3 - 2.1 95% C.I.)	(1) 0.5 % (0.1 - 2.8 95% C.I.)	(2) 1.0 % (0.3 - 3.5 95% C.I.)

The prevalence of Severe wasting (< 115 mm) and Moderate wasting (>= 115 mm and < 125 mm) was high in 6 -17 months children. (Table 50).

Table 50. Prevalence of acute malnutrition by age, based on MUAC cut off's and/or oedema

		Severe wasting (< 115 mm)		**Moderate wasting (>= 115 mm and < 125 mm)**		**Normal (> = 125 mm)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	92	2	2.2	12	13.0	78	84.8	0	0.0
18-29	93	1	1.1	6	6.5	86	92.5	0	0.0
30-41	86	0	0.0	3	3.5	83	96.5	0	0.0
42-53	96	0	0.0	1	1.0	95	99.0	0	0.0
54-59	39	0	0.0	0	0.0	39	100.0	0	0.0
Total	406	3	0.7	22	5.4	381	93.8	0	0.0

Prevalence of underweight (<-2 z-score) was 35.5 % (31.0 - 40.3 95% C.I.) and Prevalence of severe underweight (<-3 z-score) (Table 51).

Table 51. Prevalence of underweight based on weight-for-age z-scores by sex – land based camps

	All n = 403	**Boys** n = 204	**Girls** n = 199
Prevalence of underweight (<-2 z-score)	(143) 35.5 % (31.0 - 40.3 95% C.I.)	(76) 37.3 % (30.9 - 44.1 95% C.I.)	(67) 33.7 % (27.5 - 40.5 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(106) 26.3 % (22.2 - 30.8 95% C.I.)	(52) 25.5 % (20.0 - 31.9 95% C.I.)	(54) 27.1 % (21.4 - 33.7 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(37) 9.2 % (6.7 - 12.4 95% C.I.)	(24) 11.8 % (8.0 - 16.9 95% C.I.)	(13) 6.5 % (3.9 - 10.9 95% C.I.)

The prevalence of Severe underweight (<-3 z-score) and Moderate underweight (>= -3 and <-2 z-score) was high in 42-53 months children. (Table 52).

Table 52. Prevalence of underweight by age, based on weight-for-age z-scores – land base camps

	Severe	**Moderate**	**Normal**	**Oedema**

		underweight (<-3 z-score)		underweight (>= -3 and <-2 z-score)		(> = -2 z score)			
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	91	7	7.7	20	22.0	64	70.3	0	0.0
18-29	91	9	9.9	21	23.1	61	67.0	0	0.0
30-41	86	9	10.5	26	30.2	51	59.3	0	0.0
42-53	96	12	12.5	23	24.0	61	63.5	0	0.0
54-59	39	0	0.0	16	41.0	23	59.0	0	0.0
Total	403	37	9.2	106	26.3	260	64.5	0	0.0

Table 53. Prevalence of stunting based on height-for-age z-scores and by sex

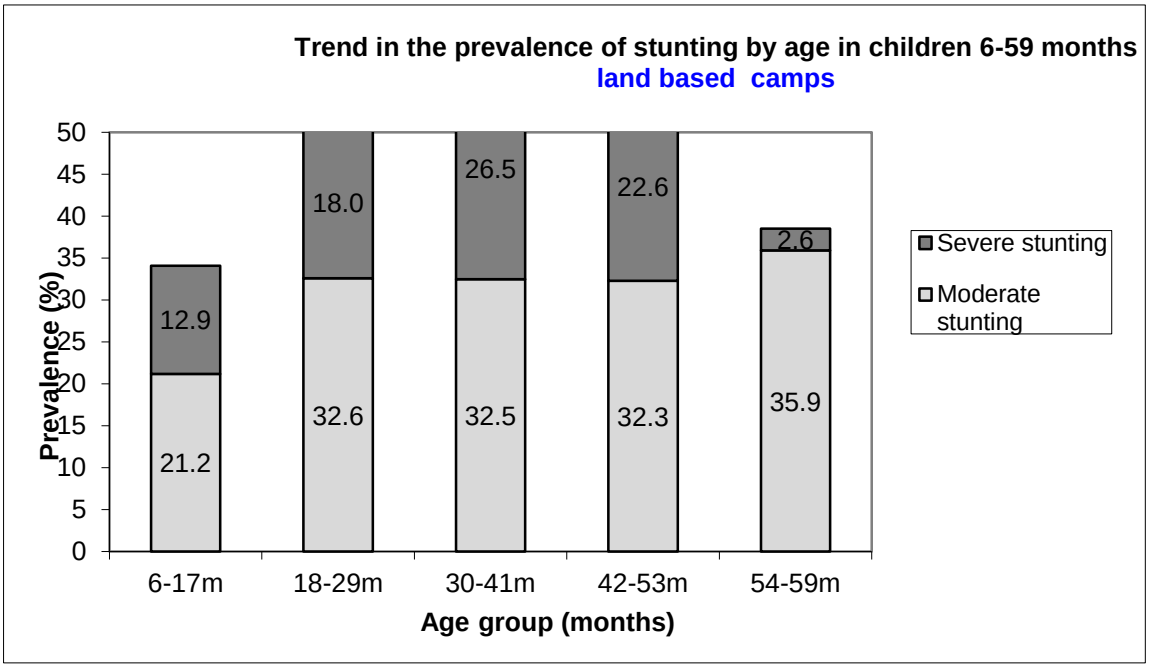
	All n = 389	**Boys** n = 194	**Girls** n = 195
Prevalence of stunting (<-2 z-score)	(189) 48.6 % (43.7 - 53.5 95% C.I.)	(99) 51.0 % (44.0 - 58.0 95% C.I.)	(90) 46.2 % (39.3 - 53.2 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(118) 30.3 % (26.0 - 35.1 95% C.I.)	(64) 33.0 % (26.8 - 39.9 95% C.I.)	(54) 27.7 % (21.9 - 34.4 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(71) 18.3 % (14.7 - 22.4 95% C.I.)	(35) 18.0 % (13.3 - 24.1 95% C.I.)	(36) 18.5 % (13.6 - 24.5 95% C.I.)

The prevalence of stunting was highest in the **30-41** age groups, which is a consistent finding given that stunting normally peaks and 3 years and then begins to decline (Table 54 and Figure 14).

Table 54. Prevalence of stunting by age based on height-for-age z-scores

		Severe stunting (<-3 z-score)		Moderate stunting (>= -3 and <-2 z-score)		Normal (> = -2 z score)	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	85	11	12.9	18	21.2	56	65.9
18-29	89	16	18.0	29	32.6	44	49.4
30-41	83	22	26.5	27	32.5	34	41.0
42-53	93	21	22.6	30	32.3	42	45.2
54-59	39	1	2.6	14	35.9	24	61.5
Total	389	71	18.3	118	30.3	200	51.4

Figure 14.



The comparison of the survey and WHO standard HAZ distribution showed that the survey Population had a higher prevalence of stunting than the reference population to the left of the WHO curve and had a lower peak with mean±SD of HAZ (n=389) : -1.99±1.14 (Figure 16).

Figure 16.

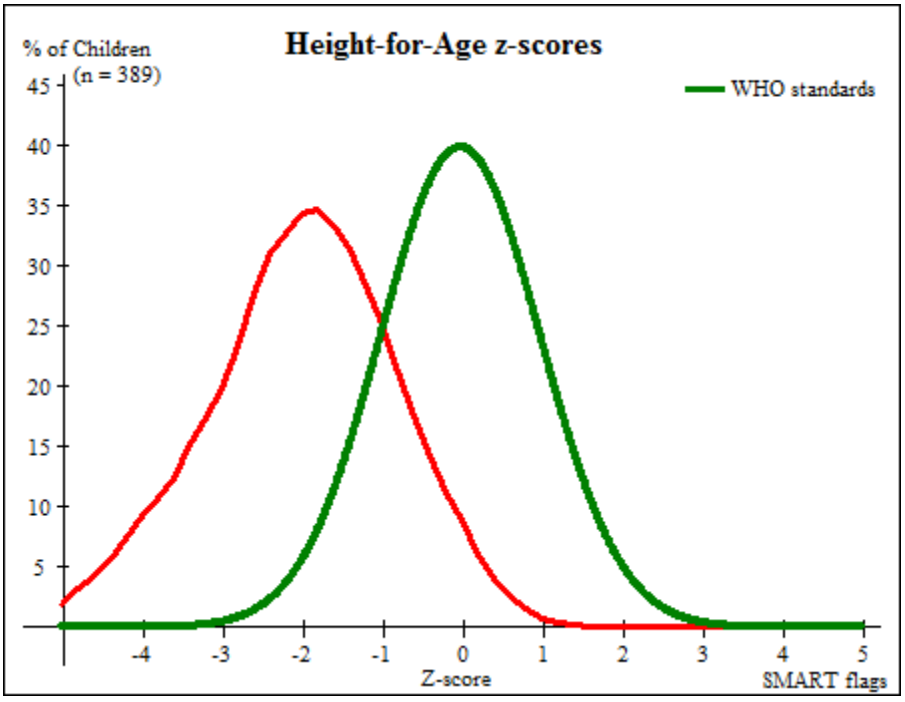


Table 55. Prevalence of overweight based on weight for height cut off's and by sex (no oedema)

	All n = 400	Boys n = 201	Girls n = 199
Prevalence of overweight (WHZ > 2)	(1) 0.3 % (0.0 - 1.4 95% C.I.)	(1) 0.5 % (0.1 - 2.8 95% C.I.)	(0) 0.0 % (0.0 - 1.9 95% C.I.)
Prevalence of severe overweight (WHZ > 3)	(0) 0.0 % (0.0 - 1.0 95% C.I.)	(0) 0.0 % (0.0 - 1.9 95% C.I.)	(0) 0.0 % (0.0 - 1.9 95% C.I.)

Table 56. Prevalence of overweight by age, based on weight for height (no oedema)

		Overweight (WHZ > 2)		Severe Overweight (WHZ > 3)	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**
6-17	90	1	1.1	0	0.0
18-29	91	0	0.0	0	0.0
30-41	85	0	0.0	0	0.0
42-53	94	0	0.0	0	0.0
54-59	40	0	0.0	0	0.0
Total	400	1	0.3	0	0.0

Table 57 shows mean z-scores and standard deviations for the three main indicators of nutritional status. The mean z-score for Weight-for-height was in the SMART recommended range of 0.8-1.2.

Table 57. Mean z-scores, Design Effects and excluded subjects

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	400	-0.81±0.95	1.00	23	8
Weight-for-Age	403	-1.67±1.00	1.00	23	5
Height-for-Age	389	-1.99±1.14	1.00	22	20

* contains for WHZ and WAZ the children with edema.

Anaemia results

The prevalence of anemia for children 6-59 months by category of severity is contained in Table 58. The total prevalence of anemia (<11g/dL) was 45.0% (39.1 -51.0 95% C.I), which is in the “high” prevalence classification of WHO. Of the sample, 1.8% (0.6 – 4.1 95% C.I) were severely (<7g/dl) and were referred to the camp clinic for treatment. (Table 58).

Table 58. Prevalence of anemia and concentration in children 6-59 months of age –land based camps, (June 215)

Anaemia – Children 6-59 months	**All**

	n =156
Total Anaemia (Hb<11.0 g/dL)	45.0 (39.1 -51.0)
Mild Anemia (Hb 10.0-10.9 g/dL)	21.1 (16.4 – 26.3)
Moderate Anaemia (7.0-9.9 g/dL)	22.1 (17.4 – 27.5)
Severe Anaemia (<7.0 g/dL)	1.8 (0.6 – 4.1)

Programme Enrolment

Prevalence of Supplementary feeding programme enrolment according to WHZ+MUAC is 44.4 % (13.7 – 78.8 95% C.I.) while as Therapeutic feeding programme enrolments is 26.1 % (14.3 – 41.1 95% CI) (Table 59)

Table 59. Prevalence of programme enrolment in Land based camps, (June2015)

Programme type	**WHZ+MUAC**	**MUAC only**
Supplementary feeding programme coverage	44.4 % (13.7 – 78.8 95% C.I.)	40.9% (20.7 -63.6)
Therapeutic feeding programme coverage	26.1 % (14.3 – 41.1 95% CI)	100%

Vaccination and supplementation programmes

Of the eligible children 9-59 months, 97.4% (97.4 -98.7 95% CI) had been vaccinated against measles, which is above the UNHCR target of 95%. (Table 60)

Measles vaccination coverage

Table 60. Measles vaccination coverage for children aged 9-59 months (n=385) – Land based camps, Sudan (June 2015)

	Measles (with card) n= 333	**Measles (with card or confirmation from mother) n= 375**
YES	86.5% (82.7 – 89.7 95% CI)	97.4% (97.4 -98.7 95% CI)

Vitamin A supplementation coverage results

Of the eligible children 9-59 months, only 50.9 % (45.9 – 55.8 95% CI) had received been Vitamin A capsule supplementation, which is below the UNHCR target of 95%. (Table 61)

Table 61. Vitamin A supplementation for children aged 6-59 months within past 6 months (n= 359) – Land based camps, Sudan (June 2015)

	Vitamin A capsule (with card)	**Vitamin A capsule (with card and confirmation from mother)**

	n=7	n=6
YES	27.1 % (22.9 – 31.8 95% CI)	50.9 % (45.9 – 55.8 95% CI)

Diarrhea results

Table 62. Prevalence of reported diarrhea in the two weeks prior to the interview – Land based camps, Sudan (June2015)

	Number/total	% (95% CI)
Diarrhoea in past 2 weeks	9.3/408	9.3 (6.8 -12.7 95% CI)

Infant and Young Child Feeding practices in children 0-23

86.6% (79.9 - 91.7 95% C.I) of the sample aged 0-23 months had been introduced to breast milk within the first hour of birth. The rate of exclusive breastfeeding for children below 6 months of age was 57% (34.0 – 78.2 95% C.I). 85.7% (69.3 – 96.0 95% C.I) of children between 12 -15 months continued breast feeding up to 1 year. 40.5 (24.8 - 57.9) 20 -23 months continued breast feeding up to 2 years. More than half of the children - 52.2% (24.8 - 57.9 95 CI) - 6 and 8 months had been introduced to solid foods and had consumed iron-rich foods. The proportion of infants and young children who had been bottle-fed was very low 2.4%, (0.9 - 5.2 95% C.I). 19.4% (13.2-27.0) minimum dietary diversity, and 6.9% (2.8 – 13.8). (Table 63)

Table 63. Prevalence of Infant and Young Child Feeding Practices indicators- Land based camps, Sudan (June2015)

Indicator	Age range	Number/total	(%)	95% CI
Early initiation of breastfeeding	0-23 months	123/142	86.6	(79.9- 91.7)
Exclusive breastfeeding under 6 months	0-5 months	12/21	57	(34.0 – 78.2)
Continued breastfeeding at 1 year	12-15 months	24/28	85.7	(69.3 – 96.0)
Continued breastfeeding at 2 years	20-23 months	12/23	47.8	(26.8 - 69.4)
Introduction of solid, semi-solid or soft foods	6-8 months	12/23	52.2	(24.8 - 57.9)
Children bottle fed	0-23 months	6/157	3.8	(1.4 - 8.1)
Consumption of iron-rich or iron-fortified foods	6-23 months	12/23	52.2	(30.6 - 73.2)
Minimum dietary diversity	6-23 months	27/139	19.4	(13.2 -27.0)
Minimum meal frequency	6-23 months	32/139	23.0	(16.3 -30.9)
Minimum acceptable diet	6-23 months	7/10	6.9	(2.8 – 13.8)
Consumption of FBF++ (Super cereal plus)	6-23 months	26/97	26.8	(18.3 -36.8)
Consumption LNS	6-23 months	22/97	22.7	14.8 – 32.3)

Table 3.18 shows the results from analysis of feeding practices for the 0-23 age group.

Women anaemia and Programme Enrolment

Anaemia And Programme Enrolment In 15 -49 Years of pregnant and reproductive women in Land Based Camps, Sudan (June 2015)

A total of 401 women aged 15-49 years were surveyed. Of these, 12.0% were pregnant. The mean age was 28 and ranged from 15 to 49 (Table 64).

Table 64. Women physiological status and age – **Land based** camps, Sudan (June 2015)

Physiological status	Number/total	% of sample
Non-pregnant	371	92.3
Pregnant	30	7.5
Mean age in years (range)	27.9 (15-49)	

The prevalence of anemia was 33.1% (27.6 -39.0 95% CI) which is within the WHO Acceptable category (Table 65).

Table 65. Prevalence of anemia and hemoglobin concentration in non-pregnant women of reproductive age (15-49 years) – Land based camps, Sudan (June 2015)

Anaemia – Non-pregnant women of reproductive age 15-49 years	**All n = 275**
Total Anaemia (<12.0 g/dL)	(91) 33.1% (27.6 -39.0 95% CI)
Mild Anaemia (11.0-11.9 g/dL)	(45)16.4 % (12.2 – 21.3 95% CI)
Moderate Anaemia (8.0-10.9 g/dL)	(40) 17.3 % (10.6-19.3 95% CI)
Severe Anaemia (<8.0 g/dL)	(6) 0.8- 4.7 95% CI)
Mean Hb (g/dL)	12.3g/dL SD 1.6

ANC enrolment and iron-folic acid supplementation coverage

Of the sample of 25 pregnant women, 83.3% (65.3 - 94.4)95% C.I) were enrolled in the ANC programme and receiving iron-folic acid pills (Table 66).

Table 66. ANC enrolment and iron-folic acid pills coverage among pregnant women (15-49 years) – Land based camps, Sudan (June 2015)

	Number/total	**% (95% CI)**
Currently enrolled in ANC programme	25/30	83.3 (65.3 - 94.4)
Currently receiving iron-folic acid pills	25/30	83.3 (65.3 - 94.4)

The prevalence of severe anemia among pregnant women was 6.7% (0.8 -22.2 95% CI), moderate anaemia 0.7% (0.8 -22.1 95% CI) and normal anaemia 86.7 (69.3 -96.2 95% CI) (Table 67)

Table 67. MUAC prevalence among pregnant women – Land based camps, Sudan (June 2015)

	Number/total	% (95% CI)
Anaemia (MUAC<21.0)	3/30	6.7 (0.8 -22.2)
Normal (MUAC> 21.0 cm	26/30	86.7 (69.3 -96.2)

Wash Coverage

Wash, Land Based Camps, Sudan, (June 2015)

Table 68 shows the different indicators and the total number of households who were sampled for each household-level indicator. All households were considered whether or not they had eligible individuals for the individual-level measurements.

Table 68. Target sample size and actual number captured during the survey- Land based Camps, Sudan (June 2011)

Indicator	Target sample size	Household interviewed during the study	% of the target
WASH	250	249	99.6

Water, Sanitation and Hygiene- Land based Camps, Sudan (June 2015)
Proportion of households using an improved drinking water source were 91.2% (86.9 -94.4 95% CI) and 63.1% (56.7 – 69.1 95% C.I) having covered or narrow-necked containers for storage (Table 69).

Table 69. Water Quality- Land based camps, Sudan (June 2015)

	Number/total	% (95% CI)
Proportion of households using an improved drinking water source	227/249	91.2 (86.9 -94.4)
Proportion of households that use a covered or narrow necked container for storing their drinking water	157/249	63.1 (56.7 – 69.1)

The mean liters of water per person per day were found to be Mean: 47.0, SD 40.6 and 87.6 (82.8-91.4 95% C.I) were meeting the UNHCR target of ≥20 lpppd (Table 70)

Table 70. Water Quantity 1: Amount of litres of water used per person per day- Land based camps, Sudan (June 2015)

Proportion of households that	% (95% CI)

access:	
≥ 20 litres	87.6 (82.8-91.4)
15 – <20 litres	6.4 (3.7-10.2)
10-<15 litres	6.0 (3.4-9.7)

Interestingly, more than 53.6% (46.3 - 60.7, 95% C.I) of households were satisfied with the drinking water source (Table71).

Table 71. Satisfaction with water supply- Land based camps, Sudan (June 2015))

	Number/total	**% (95% CI)**
Proportion of households that say they are satisfied with the drinking water supply	105/340	53.6 (46.3 - 60.7)

A very low proportion of households 29.0% (23.4 – 35.2, 95% C.I) were using an improved excreta disposal facility, with more than half 65.8% (56.6 -74.2 95% C.I) using unimproved toilets. (Table 72).

Table 72. Safe Excreta disposal- Land based camps, Sudan (June 2015)

	Number/total	**% (95% CI)**
Proportion of households using an improved excreta disposal facility (improved toilet facility, not shared)	70/249	29.0 (23.4 – 35.2)
Proportion of households using a shared family toilet	13/249	5.9 (2.0 -9.0)
Proportion of households using a communal toilet	96/347	2.5 (0.9 - 5.3)
Proportion of households using an unimproved toilet	152/241	63.1 (56.6 -69.2)
The proportion of households with children under three years old that dispose of faeces safely.	79120	65.8 (56.6 -74.2)
Proportion of households with a shared family toilet in use	247/247	5.4 (2.9 -9.0)

Mosquito Net Coverage

350 of the planned 350 households were surveyed for the mosquito net coverage module, representing 90% **(Table 73).**

Table 73. Mosquito net coverage information

Household data	**Planned**	**Actual**	**% of target**
Total households surveyed for mosquito net coverage	230	230	100

38.3% (32.0 - 44.9), 95% C.I) of households owned at least one mosquito net of any type, Whilst only 5% owned at least one LLIN, which is considerably lower than the UNHCR target of >80% (Table 74).

Table 74. Household Mosquito net ownership

	Number/total	% (95% CI)
Proportion of households owning at least one mosquito net of any type	88/230	38.3 (32.0 - 44.9)
Proportion of households owning at least one LLIN	40/230	5

3.3 Results from Labour Based Camps (Wad Sharifey, Girba and Kilo 26)

Anthropometric results

Anthropometric results (based on WHO standards 2006):

Definitions of acute malnutrition should be given (for example, global acute malnutrition is defined as <-2 z scores weight-for-height and/or oedema, severe acute malnutrition is defined as <-3z scores weight-for-height and/or oedema)

Exclusion of z-scores from Observed mean SMART flags: WHZ -3 to 3; HAZ -3 to 3; WAZ -3 to 3.

The ratio of boy: girl in all camps was within the range of (0.8-1.3), (Table 75)

Table 75. Distribution of age and sex of sample – Labour based camps

	Boys		Girls		Total		Ratio
AGE (mo)	no.	%	no.	%	no.	%	Boy: girl
6-17	44	50.0	44	50.0	88	24.5	1.0
18-29	45	52.3	41	47.7	86	24.0	1.1
30-41	48	62.3	29	37.7	77	21.4	1.7
42-53	48	64.9	26	35.1	74	20.6	1.8
54-59	15	44.1	19	55.9	34	9.5	0.8
Total	200	55.7	159	44.3	359	100.0	1.3

Using the WHZ indicator and edema, the calculated prevalence of Global Acute Malnutrition (GAM) was 20.1 % (16.2 - 24.5 95% C.I.) with 3.7 % (2.2 - 6.2 95% C.I.) children having Severe Acute Malnutrition (SAM). (Table 76).

Table 76. Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

	All n = 354	Boys n = 199	Girls n = 155
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(71) 20.1 % (16.2 - 24.5 95% C.I.)	(43) 21.6 % (16.5 - 27.8 95% C.I.)	(28) 18.1 % (12.8 - 24.9 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(58) 16.4 % (12.9 - 20.6 95% C.I.)	(33) 16.6 % (12.1 - 22.4 95% C.I.)	(25) 16.1 % (11.2 - 22.7 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(13) 3.7 % (2.2 - 6.2 95% C.I.)	(10) 5.0 % (2.8 - 9.0 95% C.I.)	(3) 1.9 % (0.7 - 5.5 95% C.I.)

The prevalence of oedema is 0.0 %

The analysis by age group revealed that acute malnutrition was highest in the 6-17 months age group and generally decreased with age (Table 77).

Table 77. Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema

		Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Age (mo)	Total no.	No.	%	No.	%	No.	%	No.	%
6-17	84	5	6.0	19	22.6	60	71.4	0	0.0
18-29	86	3	3.5	16	18.6	67	77.9	0	0.0
30-41	77	3	3.9	11	14.3	63	81.8	0	0.0
42-53	73	2	2.7	8	11.0	63	86.3	0	0.0
54-59	34	0	0.0	4	11.8	30	88.2	0	0.0
Total	354	13	3.7	58	16.4	283	79.9	0	0.0

A comparison of the WHZ distribution curves for the survey and WHO is shown in Figure 2. The survey curve is positioned to the right of the WHO curve, indicating a lower prevalence of acute malnutrition than the reference population. (Figure 17).

Figure 17.

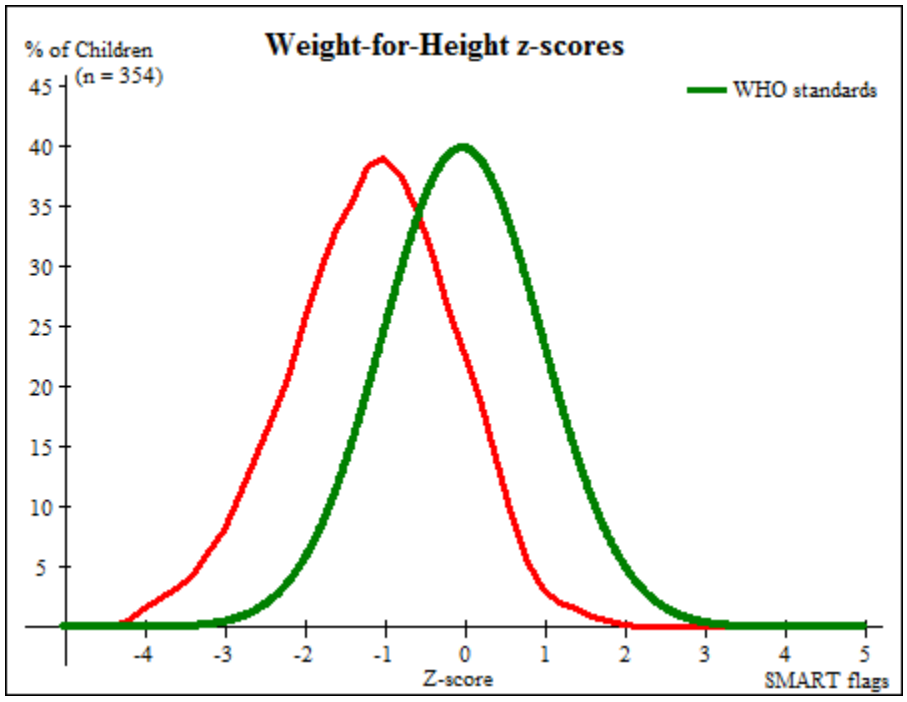


Table 78. Distribution of acute malnutrition and oedema based on weight-for-height z-scores

	<-3 z-score	>=-3 z-score
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 15 (4.2 %)	Not severely malnourished No. 342 (95.8 %)

The prevalence of oedema is 0.0 %

The Prevalence of global acute malnutrition (< 125 mm and/or oedema) is 6.7 % (4.5 - 9.8 95% C.I.) with 1.1 % (0.4 - 2.8 95% C.I) Prevalence of severe malnutrition (< 115 mm and/or oedema) (Table 79).

Table 79. Prevalence of acute malnutrition based on MUAC cut off's (and/or oedema) and by sex

	All n = 359	Boys n = 200	Girls n = 159
Prevalence of global malnutrition (< 125 mm and/or oedema)	(24) 6.7 % (4.5 - 9.8 95% C.I.)	(7) 3.5 % (1.7 - 7.0 95% C.I.)	(17) 10.7 % (6.8 - 16.5 95% C.I.)

Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	(20) 5.6 % (3.6 - 8.4 95% C.I.)	(6) 3.0 % (1.4 - 6.4 95% C.I.)	(14) 8.8 % (5.3 - 14.2 95% C.I.)
Prevalence of severe malnutrition (< 115 mm and/or oedema)	(4) 1.1 % (0.4 - 2.8 95% C.I.)	(1) 0.5 % (0.1 - 2.8 95% C.I.)	(3) 1.9 % (0.6 - 5.4 95% C.I.)

The analysis by age group revealed that acute malnutrition was highest in the 6-17 months age group. This is not significantly different from the calculation by WHZ and edema (Table 80).

Table 80. Prevalence of acute malnutrition by age, based on MUAC cut off's and/or oedema

		Severe wasting (< 115 mm)		**Moderate wasting (>= 115 mm and < 125 mm)**		**Normal (> = 125 mm)**		**Oedema**	
Age (mo)	Total no.	No.	%	No.	%	No.	%	No.	%
6-17	88	4	4.5	16	18.2	68	77.3	0	0.0
18-29	86	0	0.0	2	2.3	84	97.7	0	0.0
30-41	77	0	0.0	2	2.6	75	97.4	0	0.0
42-53	74	0	0.0	0	0.0	74	100.0	0	0.0
54-59	34	0	0.0	0	0.0	34	100.0	0	0.0
Total	359	4	1.1	20	5.6	335	93.3	0	0.0

The proportion of children who were underweight was 40.2 % (35.2 - 45.4 95% C.I.), with 11.9 % (8.9 - 15.7 95% C.I.) severely underweight (Table 81).

Table 81. Prevalence of underweight based on weight-for-age z-scores by sex

	All n = 353	**Boys n = 198**	**Girls n = 155**
Prevalence of underweight (<-2 z-score)	(142) 40.2 % (35.2 - 45.4 95% C.I.)	(75) 37.9 % (31.4 - 44.8 95% C.I.)	(67) 43.2 % (35.7 - 51.1 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(100) 28.3 % (23.9 - 33.2 95% C.I.)	(53) 26.8 % (21.1 - 33.3 95% C.I.)	(47) 30.3 % (23.6 - 38.0 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(42) 11.9 % (8.9 - 15.7 95% C.I.)	(22) 11.1 % (7.5 - 16.2 95% C.I.)	(20) 12.9 % (8.5 - 19.1 95% C.I.)

The analysis by age group revealed that acute malnutrition was highest in the 6-17 months age group. This is not significantly different from the calculation by WHZ and edema (Table 82).

Table 82. Prevalence of underweight by age, based on weight-for-age z-scores

		Severe underweight (<-3 z-score)		Moderate underweight (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Age (mo)	Total no.	No.	%	No.	%	No.	%	No.	%
6-17	85	15	17.6	16	18.8	54	63.5	0	0.0
18-29	85	10	11.8	22	25.9	53	62.4	0	0.0
30-41	75	10	13.3	24	32.0	41	54.7	0	0.0
42-53	74	7	9.5	19	25.7	48	64.9	0	0.0
54-59	34	0	0.0	19	55.9	15	44.1	0	0.0
Total	353	42	11.9	100	28.3	211	59.8	0	0.0

The prevalence of chronic malnutrition was 44.8 % (39.6 - 50.1 95% C.I.) with a severe stunting prevalence of 14.8 % (11.5 - 19.0) the prevalence of chronic malnutrition is above of WHO severity classification (Table 83).

Table 83. Prevalence of stunting based on height-for-age z-scores and by sex

	All n = 344	**Boys n = 194**	**Girls n = 150**
Prevalence of stunting (<-2 z-score)	(154) 44.8 % (39.6 - 50.1 95% C.I.)	(86) 44.3 % (37.5 - 51.4 95% C.I.)	(68) 45.3 % (37.6 - 53.3 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(103) 29.9 % (25.3 - 35.0 95% C.I.)	(62) 32.0 % (25.8 - 38.8 95% C.I.)	(41) 27.3 % (20.8 - 35.0 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(51) 14.8 % (11.5 - 19.0 95% C.I.)	(24) 12.4 % (8.5 - 17.7 95% C.I.)	(27) 18.0 % (12.7 - 24.9 95% C.I.)

The prevalence of stunting was highest in the 18-29 age groups, which is a consistent finding given that stunting normally peaks and 2 years and then begins to decline (Table 84).

Table 84. Prevalence of stunting by age based on height-for-age z-scores

		Severe stunting (<-3 z-score)		Moderate stunting (>= -3 and <-2 z-score)		Normal (> = -2 z score)	
Age (mo)	Total no.	No.	%	No.	%	No.	%
6-17	78	10	12.8	19	24.4	49	62.8
18-29	84	17	20.2	25	29.8	42	50.0
30-41	74	12	16.2	31	41.9	31	41.9
42-53	74	11	14.9	17	23.0	46	62.2
54-59	34	1	2.9	11	32.4	22	64.7
Total	344	51	14.8	103	29.9	190	55.2

The comparison of the survey and WHO standard HAZ distribution showed that the survey population had a higher prevalence of stunting than the reference population (to the left of the WHO curve) and had a lower peak (Figure 18).

Figure 18.

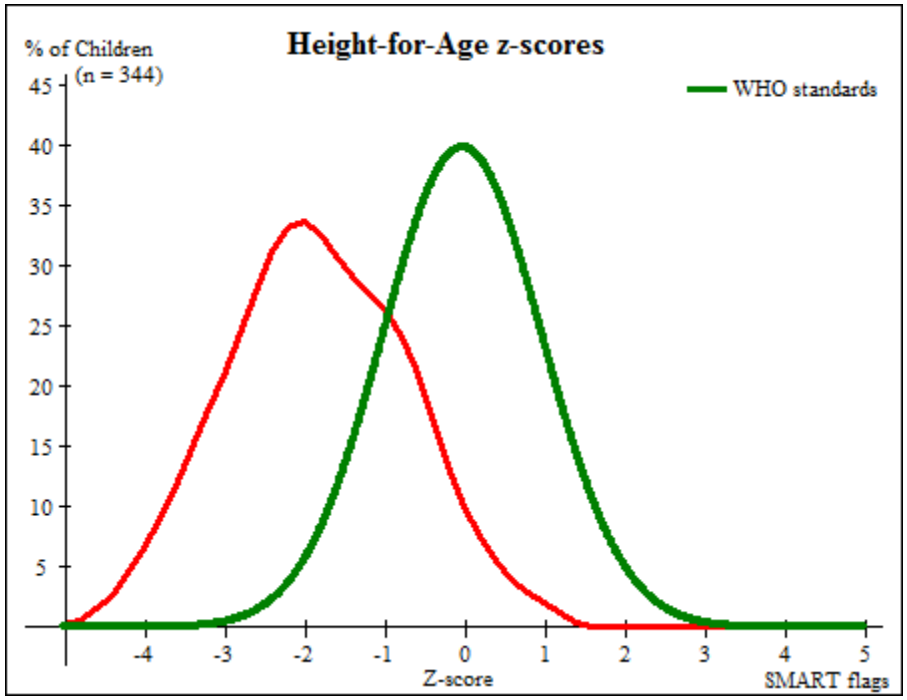


Table 85. Prevalence of overweight based on weight for height cut off's and by sex (no oedema)

	All n = 354	Boys n = 199	Girls n = 155
Prevalence of overweight (WHZ > 2)	(0) 0.0 % (0.0 - 1.1 95% C.I.)	(0) 0.0 % (0.0 - 1.9 95% C.I.)	(0) 0.0 % (0.0 - 2.4 95% C.I.)
Prevalence of severe overweight (WHZ > 3)	(0) 0.0 % (0.0 - 1.1 95% C.I.)	(0) 0.0 % (0.0 - 1.9 95% C.I.)	(0) 0.0 % (0.0 - 2.4 95% C.I.)

Table 86. Prevalence of overweight by age, based on weight for height (no oedema)

		Overweight (WHZ > 2)		Severe Overweight (WHZ > 3)	
Age (mo)	Total no.	No.	%	No.	%
6-17	84	0	0.0	0	0.0
18-29	86	0	0.0	0	0.0
30-41	77	0	0.0	0	0.0
42-53	73	0	0.0	0	0.0
54-59	34	0	0.0	0	0.0
Total	354	0	0.0	0	0.0

Table 86 shows mean z-scores and standard deviations for the three main indicators of nutritional status. The mean z-score for Weight-for-height was in the SMART recommended range of 0.8-1.2.

Table 86. Mean z-scores, Design Effects and excluded subjects

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	354	-1.15±1.00	1.00	19	3
Weight-for-Age	353	-1.81±0.98	1.00	17	6
Height-for-Age	344	-1.83±1.11	1.00	19	13

* contains for WHZ and WAZ the children with edema.

Anaemia results

The prevalence of anemia for children 6-59 months by category of severity is contained in Table 87. The total prevalence of anemia (<11g/dL) was 43.6 (35.7 – 51.8), which is in the “high” prevalence classification of WHO. Of the sample, 1.3% (0.2- 4.6 95% C.I) were

severely anemic (<7g/dl) and were referred to the camp clinic for treatment. (Table 87)

Table 87. Prevalence of anemia and hemoglobin concentration in children 6-59 months of age –Labor based camps, (June 215)

Anaemia – Children 6-59 months	**All** **n = 156**
Total Anaemia (Hb<11.0 g/dL)	43.6 (35.7 – 51.8)
Mild Anemia (Hb 10.0-10.9 g/dL)	26.9 (120.1 – 34.6)
Moderate Anaemia (7.0-9.9 g/dL)	15.4 (10.1 -22.0)
Severe Anaemia (<7.0 g/dL)	1.3 (0.2 – 4.6)

Anemia was highest in the 24-35 months age group and decreased with age (Table 88).

Table 88. Prevalence of anemia by age- Land based camps, Sudan (June 2015)

		Severe Anaemia (<7.0 g/dL)		**Moderate Anaemia (7.0-9.9 g/dL)**		**Mild Anaemia (Hb 10.0-10.9 g/dL)**		**Total Anaemia (Hb<11g.0 g/dL)**		**Normal (Hb≥11.0 g/dL)**	
Age (mths)	Total no.	No.	% (95% CI)	No.	% (95% CI)	No.	% (95% CI)	No.	% (95% CI)	No.	% (95% CI)
6-23	59	1	1.7 (0.0 – 9.1)	10	16.9 (8.4-29.0)	20	33.9 (22.1 - 47.4)	31	52.5 (59.1-65.7)	28	47.5 (34.3-60.9)
24-35	32	1	3 (0.1 - 16.2)	7	21.9 (9.3 -40.1)	8	25.0 (11.5 - 43.4)	16	50.0 (31.9 - 68.1)	16	50.0 (31.9 - 68.1)
36-59	65	0	0.0 (0.0 -5.5)	7	10.8 (4.4-20.9)	14	21.5 (12.3-33.5)	21	32.3 (21.2 - 45.1)	44	71.7 (66.9-76.5)
Total	156	2	1.3 (0.2 – 4.6)	34	15.4 (10.1 - 22.0)	42	26.9 (120.1 – 34.6)	68	43.6 (35.7 – 51.8)	88	56.4 (48.2 - 64.3)

Programme Enrolment

Prevalence of Supplementary feeding programme enrolment according to WHZ+MUAC was 35.9 % (24.3 - 48.0 95% CI) whilst Therapeutic feeding programme enrolment was only 5.3 % (0.1 – 26.0 95% C.I.). (Table 89)

Table 89. Prevalence of programme enrolment in Shagarab camps, (June2015)

Programme type	**WHZ+MUAC**	**MUAC only**
Supplementary feeding programme coverage	35.9 % (24.3 - 48.0 95% CI)	60.0% (36.1 -80.9)
Therapeutic feeding programme coverage	5.3 % (0.1 – 26.0 95% C.I.)	25.0 % 0.6 -80.6

Vaccination and supplementation programmes

Of the eligible children 9-59 months, 97.6 % (95.2 – 98.9 95% CI) with card and confirmation from mother had been vaccinated against measles, which is within acceptable of the UNHCR target of 95% (Table 90).

Measles vaccination results

Table 90. Measles vaccination coverage for children aged 9-59 months (n=336) – Labour based camps, Sudan (June 2015)

	Measles (with card) n= 278	**Measles (with card and confirmation from mother) n= 91**
YES	82.7% (78.3 -86.6 95% CI)	97.6 % (95.2 – 98.9 95% CI)

Vitamin A supplementation results

Within the 6-59 months group, only 3.6 % (2.0 – 6.3 95% CI) had received Vitamin A supplementation in the preceding 6 months, with 0.8 % (0.3 – 1.9 95% CI) with confirmation from cards. The proportion of children who had received Vitamin A supplementation is below the UNHCR target of >90% (Table 91).

Table 91. Vitamin A supplementation for children aged 6-59 months within past 6 months (n= 359) – Labor based camps, Sudan (June 2015)

	Vitamin A capsule (with card) n=30	**Vitamin A capsule (with card or confirmation from mother) n=5**
YES	0.8 % (0.3 – 1.9 95% CI)	3.6 % (2.0 – 6.3 95% CI)

Diarrhea results

Of the sampled children 6-59 months, 8.9 (6.3 -12.5 95% CI) reported having experienced diarrhea in the preceding 2 weeks (Table 8).

Table 92. Prevalence of reported diarrhea in the two weeks prior to the interview – Labour based camps, Sudan (June2015)

	Number/total	% (95% CI)
Diarrhoea in past 2 weeks	32/359	8.9 (6.3 -12.5 95% CI)

Infant and Young Child Feeding practices in children 0-23 months

95.3% (90.2 - 98.3)95% C.I) of the sample aged 0-23 months had been introduced to breast milk within the first hour of birth. The rate of exclusive breastfeeding for children below 6 months of age was 66.7% (38.4 - 88.2 95% C.I). 84.6 (65.1 - 95.6 95% C.I) of children between 12 -15 months continued breast feeding up to 1 year. 42.9% (21.8 - 66.0) of 20 -

23 months continued breast feeding up to 2 years. 47.8% (26.8 - 69.4 95% C.I) of 6 and 8 months had been introduced to solid foods. Only 32.0% (24.1- 40.9 95% C.I) of children 6-23 months had consumed iron-rich foods. The proportion of infants and young children who had been bottle-fed was very low 5.5% (2.4 -10.6 95% C.I). 26.6% (19.1 – 35.1) Minimum dietary diversity and minimum frequency diet and 12.5 (6.4-21.3)3.8% of minimum acceptable diet. (Table 93)

Table 93. Prevalence of Infant and Young Child Feeding Practices indicators- Labour based camps, Sudan (June2015)

Indicator	Age range	Number/total	Prevalence (%)	95% CI
Early initiation of breastfeeding	0-23 months	123/129	95.3	(90.2 - 98.3)
Exclusive breastfeeding under 6 months	0-5 months	10/15	66.7	(38.4 - 88.2)
Continued breastfeeding at 1 year	12-15 months	22/26	84.6	(65.1 - 95.6)
Continued breastfeeding at 2 years	20-23 months	9/21	42.9	(21.8 - 66.0)
Introduction of solid, semi-solid or soft foods	6-8 months	11/23	47.8	(26.8 - 69.4)
Children bottle fed	0-23 months	8/145	5.5	(2.4 – 10.6)
Consumption of iron-rich or iron-fortified foods	6-23 months	41/128	32.0	(24.1- 40.9)
Minimum dietary diversity	6-23 months	34/128	26.6	(19.1 – 35.1)
Minimum meal frequency	6-23 months	34/128	26.6	(19.1 – 35.1)
Minimum acceptable diet	6-23 months	11/88	12.5	(6.4 - 21.3)
Consumption of FBF++ (Super cereal plus)	6-23 months	21/95	22.1	14.2 -31.8)
Consumption LNS	6-23 months	17/95	17.9	10.8 -27.1)

Table 93 shows the results from analysis of feeding practices for the 0-23 age group.

Women anaemia and Programme Enrolment

A total of 386 women aged 15-49 years were surveyed. Of these, 12.0% were pregnant. The mean age was 28 and ranged from 15 to 49 (Table 10).

Table 94. Women physiological status and age – Labour based camps, Sudan (June 2015)

Physiological status	Number/total	% of sample
Non-pregnant	318	86
Pregnant	68	18.5
Mean age in years (range)	28.6 (15-49)	

The prevalence of anemia was 42.9% (35.1 – 50.9 95% CI), which is within the WHO “serious” category (Table 95).

Table 95. Prevalence of anemia and hemoglobin concentration in non-pregnant women of

reproductive age (15-49 years) – Labor based camps, Sudan (June 2015)

Anaemia – Non-pregnant women of reproductive age 15-49 years	All n = 318
Total Anaemia (<12.0 g/dL)	(69) 42.9% (35.1 – 50.9 95% CI)
Mild Anaemia (11.0-11.9 g/dL)	(42) 26.1% (19.5 -33.6 95% CI)
Moderate Anaemia (8.0-10.9 g/dL)	(20 12.4 % (7.8 -18.5 95% CI)
Severe Anaemia (<8.0 g/dL)	(7) 4.3% (1.8 -8.8 95% CI)
Mean Hb (g/dL)	12.3g/dL SD 1.5

ANC enrolment and iron-folic acid supplementation coverage

Of the sample of 16 pregnant women, 82.9 (67.9 – 92.8 95% C.I) were enrolled in the ANC programme and 70.7 (54.5 – 83.9) receiving iron-folic acid pills (Table 96).

Table 96. ANC enrolment and iron-folic acid pills coverage among pregnant women (15-49 years) – Labour based camps, Sudan (June 2015)

	Number/total	% (95% CI)
Currently enrolled in ANC programme	34/41	82.9 (67.9 – 92.8)
Currently receiving iron-folic acid pills	29/41	70.7 (54.5 – 83.9)

Table 97 show the prevalence of severe anemia among pregnant women was 7.3% (1.5 -19.9 95% CI), moderate anemia 12.2 % (13.0 – 21.5 95% CI and normal anemia 80.5 (65.1 -91.2 95% CI).

Table 97. MUAC prevalence among pregnant women – Labour based camps, Sudan (June 2015)

	Number/total	% (95% CI)
Anaemia (MUAC<21.0)	5/41	12.2 (4.1 – 26.2)
Normal (MUAC>21.0 cm	33/41	80.5 (65.1 -91.2)

Wash Coverage

Table 100 shows the different indicators and the total number of households who were sampled for each household-level indicator. All households were considered whether or not they had eligible individuals for the individual-level measurements.

100% of the target households were included in the survey (Table 100).

Table 100. Target sample size and actual number captured during the survey- Labour

Camps, Sudan (June 2011)

Indicator	Target sample size	Household interviewed during the study	% of the target
WASH	196	196	100

WATER, SANITATION AND HYGIENE- LABOR BASED CAMPs, SUDAN (June 2015)

Proportion of households using an improved drinking water source were 66.3(59.2 -72.9 and 93.8% (88.8 - 97.0, 77.0 (70.5- 82.7 95% C.I) having covered or narrow-necked containers for storage (Table 101).

Table 101. Water Quality- Labour based camps, Sudan (June 2015)

	Number/total	% (95% CI)
Proportion of households using an improved drinking water source	130/196	66.3(59.2 -72.9)
Proportion of households that use a covered or narrow necked container for storing their drinking water	151/196	77.0 (70.5-82.7)

In terms of water usage, an average of 29.1 liters were being used per person per day, and 64.3 (57.1- 71.0 95% C.I) were meeting the UNHCR target of ≥20 lpppd (Table 102).

Table 102. Amount of litres of water used per person per day- Labor based camps, Sudan (June 2015)

Proportion of households that access:	Number/total	% (95% CI)
≥ 20 litres	42/196	21.4 (15.9 -27.8)
15 – <20 litres	126/196	64.3 (57.1- 71.0)
10-<15 litres	28/196	14.3 (9.7 – 20.0)

Mean 29.1=7; SD 25.3

Only 53.6% (46.3 – 60.7 95% C.I) of households were satisfied with the drinking water source (Table 103)

Table 103. Satisfaction with water supply- Labor based Camps, Sudan (June 2015))

	Number/total	% (95% CI)
Proportion of households that say they are satisfied with the drinking water supply	105/345	53.6 (46.3 – 60.7)

A very low proportion of households 29.0% (23.4 – 35.2 95% C.I) were using an improved excreta disposal facility, 63.1% (50.6 – 69.2 95% C.I) using unimproved toilets. (Table 104).

Table 104. Safe Excreta disposal- Labor based camps, Sudan (June 2015)

	Number/total	% (95% CI)
Proportion of households using an improved excreta	70/241	29.0 (23.4 – 35.2)

disposal facility (improved toilet facility, not shared)		
Proportion of households using a shared family toilet	13/241	5.4 (2.9 – 9.0)
Proportion of households using a communal toilet	6/241	2.5 (0.9 – 5.3)
Proportion of households using an unimproved toilet	152/241	63.1(50.6 – 69.2)
The proportion of households with children under three years old that dispose of faeces safely.	57/94	60.6 (50.0 -70.6)

4. LIMITATIONS

- The Household list was not updated; a significant number of household which were randomly selected into the sample turned out to be “abandoned”, where the residents of the household had relocated from the camp and had to be replaced.
- In East Sudan camps the list of households contains an identifier for the zone, block, case number as well as the name of the household head, but with no household number, and with no label on the house itself. The selection of households was therefore such that the teams needed to find each household using the name and case number, which was very difficult.

5. DISCUSSION

Nutritional status of young children (6-59 months)

The 2015 survey shows that boys and girls were equally represented in all camps. The ratio of boy: girl in all camps was within the recommended range (0.8-1.2), the plausibility test for data sets for land based camps was excellent while for Shagarab and Labour based camps were good as rated by ENA for SMART software.

Global acute malnutrition

The overall nutritional situation in the Shagarb and Labour based camps is high with Global Acute Malnutrition (GAM) rate at 17.3% and 20% respectively a level indicative of a crisis, being above WHO threshold of 15%. While land based camps are acceptable with Global Acute Malnutrition of 9.5%. The prevalence of Global acute malnutrition (GAM) has slightly increased in Shagarab from 14.7% in 2013 to 17.2% in 2015. The 2013 and 2015 survey results are not fully comparable as the survey in 2013 was carried out in November after the rains and post-harvest period. As a result, it is assumed that there were comparatively more labor work and food available in November, as opposed to June when the dry season and the lean period peaks. The nutrition survey results which was conducted in the same period (June 2011) from Shagarab camps revealed similar findings of 17.7% (15.5 -20). Therefore,

June will continue to define the lean period and the pre-harvest period, the worst nutritional situation period in the east Sudan camps for a normal year, therefore, it should be considered the ideal time for subsequent surveys in order to generate more comparable results.

The variance of the GAM rate between Land based, labour and Shagarab may be attributed to their different livelihood background as Um Gargour, Abuda and Fau V refugee households are allocated some land for agriculture use, by the Government of Sudan where refugee can farm different crops and produce their own food to improve their nutritional situation than relying only on mare handouts. On the other hand, Shagarab and Labor based camps are heavily dependents on hand outs. Given this findings, there is strong reason to advocate for similar solutions of allocating some land for agriculture use to other camps to improve nutrition and livelihoods.

Chronic malnutrition (Stunting)

The majority of surveyed children have an immunization cards indicating their date of birth and their age data was reliable. The stunting rate and underweight indices seems persistent over the years. Stunting rates in 2015, is 48.6% (43.7-53.5), 57.9% (54.0-61.7), 44.8% (39.6-50.1) in Land based, Shagarab and Labor based camps respectively. However, 2013 result compared to 2015 survey result from shagarab camps has slightly declined from 64.9% to 57.9%. Despite the reducing trends recorded from most of the camps, the stunting levels still continue to be above the WHO threshold of < 40 per cent.

The high stunting levels are likely to be associated with poverty, illiteracy, disease, poor health seeking practices like relying on traditional healers to cure malnutrition and burning a hot nail on the child's gum to prevent diarrhea and stimulate teeth to grow. Accordingly, it is presumed that poor complementary feeding practices, poor health seeking behavior coupled with the harmful traditional practices may lead to inadequate dietary intake and therefore increase the malnutrition rate among the children of less than 5 years. Moreover, for mother and children who have lived in chronic food shortage conditions all their infancy and childhood, such findings with very high rates of chronic malnutrition is very common.UNHCR and partners require a concerted efforts to revise the existing poor health practices and design strategies and intervention to reduce the chronic malnutrition.

Anemia prevalence among children and women

The prevalence of anemia among children (6-59 months was 45.0% (39.1-51.0) in land based camp, 53.2% (47.6 – 58.7) in Shagarb camps and 43.6% (39.1- 51.0) in labor based camps. The levels of anemia among children remained above the WHO "high" classification for public health significance.

Anemia is usually an indicator of both poor nutrition and poor health. The condition often leads to an increased risk to maternal and child mortality, in addition to poor cognitive and physical development among children. In adults, poor physical performance, particularly work productivity can also be a negative consequence of being aneamic.

Young and child feeding practices

The proportion of children introduced to breast milk within an hour of birth (timely initiation of breastfeeding) was quite high in Land based Camps, Shagarab and Labor bases camps was 86.6%, 99.2%) and 95.3% respectively, 57.1%, 50.0% and 66.7% of children had been exclusively breastfed. However, 52.2% (30.6 -73.2), 40.5% and 47.8% of 6 -8 months children had been introduced to solids food, and consumption of iron-rich foods were 52.2%, 27.9% and 32.0% in Land based, Shagarab and Labor based Camps respectively. Given these findings, the IYCF practices definitely need to be improved, and the strengthening of IYCF interventions is highly precedence.

Measles Vaccination and vitamin A supplementation

Measles vaccination was very high across all camps. However, the Vitamin A supplementation was low as there was no Vit A supplementation activity carried out 6 months prior to the survey in all the camps.

WASH indicators

The proportion of households surveyed using an improved drinking water source was 91.2%, 66.7% and 66.3% in land based, Shagarab and labour camps respectively. The proportion of households using ≥ 20 litres per person per day was 87.6%, 51.6% and 64.3% in Land, shagarab and Labor camps, respectively; the proportion of households using an unimproved toilet was high at 63.1%, 77.6% and 61.4%. Not surprisingly, there was a low proportion of households with children <3 years disposing of faeces appropriately.

Poor water, sanitation and hygiene have serious consequences on the health and nutritional status, especially among the most vulnerable population groups. Improvements in hygiene and particularly hand washing with soap can have a significant impact on reducing diarrheal diseases. Diarrhea is a serious global public health problem, particularly in low-income and middle-income countries. The World Health Organization estimates that over three million episodes occur each year, with many people dying, especially children aged less than five years in low- and middle-income countries. Persistent diarrhea can also contribute to malnutrition, reduced resistance to infections, and sometimes impaired growth and development.

Mosquito net coverage and utilization

The survey results showed the proportion of households owing at least one LLIN was 38.3%, 29.7% and 43.1% in Land based, Shagarb and Labor based camps respectively, much lower than the target of >80%. The total household members who slept under an LLIN was very low, 5% and below across all camps.

6. CONCLUSION

The overall nutritional situation in the Shagarb and Labour based camps is high with Global Acute Malnutrition (GAM) rate at 17.3% and 20% respectively a level indicative of a crisis, being above WHO threshold of 15%. While land based camps are acceptable with Global Acute Malnutrition of 9.5%. Anemia remained above the critical threshold for children, and generally below the critical threshold for women. In terms of infant and young child feeding, the rate of early initiation of breastfeeding was high in the population. However, the rate of exclusive breastfeeding and timely initiation of complementary feeding was low. The coverage of improved drinking water source was promising in all camps but a low proportion of households had access to an improved excreta disposal facility and therefore this must be addressed. Mosquito net ownership was also below the UNHCR targets and needs improvement.

7. RECOMMENDATIONS

Immediate term

- Continue with the existing programs at the SFP, OTP and SC coupled with enhanced community outreach strategy for active and passive case finding of the cases with malnutrition.
- WFP to continue the supplementary feeding programme for children 6-59 months and ensure increased awareness and sensitisation for proper utilization of the supplementary foods in the target group.
- Strengthen the awareness, promotion, and protection of Infant and Young Child Feeding through baby friendly space, expanded mother to mother support groups and by accelerating sensitisation and awareness creation on appropriate breast-feeding and complementary feeding practices.
- Strengthen the routine measles vaccination programme by working closely with the Community health workers through defaulter tracing at block level and house to house checking for the immunisation status of under 5 and referring those identified as not immunized.
- Organize Mass Vitamin A supplementation as soon as possible, and ensure a regular schedule of the supplementation after every 6 months.
- Improve coverage and maintenance of household latrines (1 latrine for 1 to 2 families).
- UNHCR, COR in collaboration with the health partners to ensure provision of adequate mosquito nets coupled with strong message on its utilization.

Medium term

- UNHCR to continue to conduct annual nutrition surveys in May/June (the lean season) as in 2015, so as to allow comparison and monitor the trends.
- UNHCR to distribute water containers to all households in camps to increase safe storage of water for domestic use.
- Increase the ability of the refugees to produce own food at household level in order

to diversify not only their daily dietary intake but also income through available agriculture based production options. An activity currently implemented jointly by UNHCR and FAO at pilot level in three refugee camps.

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4. World Health Organization (2013) Guideline update: Technical aspects of the management of severe acute malnutrition in infants and children.
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APPENDIX

Appendix 1

Plausibility check for: Shagarab Camps

Standard/Reference used for z-score calculation: WHO standards 2006
(If it is not mentioned, flagged data is included in the evaluation. Some parts of this plausibility report are more for advanced users and can be skipped for a standard evaluation**)**

Overall data quality

Criteria	Flags*	Unit	Excel.	Good	Accept	Problematic	**Score**
Flagged data	Incl	%	0-2.5	>2.5-5.0	>5.0-7.5	>7.5	
(% of out of range subjects)			0	5	10	20	**0** (2.3 %)
Overall Sex ratio	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**2** (p=0.068)
Age ratio(6-29 vs 30-59)	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**2** (p=0.081)
Dig pref score - weight	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (7)
Dig pref score - height	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**4** (13)
Dig pref score - MUAC	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**2** (9)
Standard Dev WHZ	Excl	SD	<1.1	<1.15	<1.20	>=1.20	
.			and	and	and	or	
.	Excl	SD	>0.9	>0.85	>0.80	<=0.80	
			0	5	10	20	**0** (1.00)
Skewness WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**0** (-0.02)
Kurtosis WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**0** (-0.15)
Poisson dist WHZ-2	Excl	p	>0.05	>0.01	>0.001	<=0.001	
			0	1	3	5	**0** (p=)
OVERALL SCORE WHZ =			0-9	10-14	15-24	>25	**10** %

The overall score of this survey is 10 %, this is good.

Appendix 2

Plausibility check for: Land Based Camps

Standard/Reference used for z-score calculation: WHO standards 2006
(If it is not mentioned, flagged data is included in the evaluation. Some parts of this plausibility report are more for advanced users and can be skipped for a standard evaluation)

Overall data quality

Criteria	Flags*	Unit	Excel.	Good	Accept	Problematic	**Score**
Flagged data (% of out of range subjects)	Incl	%	0-2.5 0	>2.5-5.0 5	>5.0-7.5 10	>7.5 20	**0** (2.0 %)
Overall Sex ratio (Significant chi square)	Incl	p	>0.1 0	>0.05 2	>0.001 4	<=0.001 10	**0** (p=0.961)
Age ratio(6-29 vs 30-59) (Significant chi square)	Incl	p	>0.1 0	>0.05 2	>0.001 4	<=0.001 10	**0** (p=0.927)
Dig pref score - weight	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	**2** (8)
Dig pref score - height	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	**4** (15)
Dig pref score - MUAC	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	**2** (10)
Standard Dev WHZ .	Excl	SD	<1.1 and	<1.15 and	<1.20 and	>=1.20 or	
.	Excl	SD	>0.9 0	>0.85 5	>0.80 10	<=0.80 20	**0** (0.95)
Skewness WHZ	Excl	#	<±0.2 0	<±0.4 1	<±0.6 3	>=±0.6 5	**0** (0.11)
Kurtosis WHZ	Excl	#	<±0.2 0	<±0.4 1	<±0.6 3	>=±0.6 5	**0** (0.07)
Poisson dist WHZ-2	Excl	p	>0.05 0	>0.01 1	>0.001 3	<=0.001 5	**0** (p=)
OVERALL SCORE WHZ =			0-9	10-14	15-24	>25	**8** %

The overall score of this survey is 8 %, this is excellent

Appendix 3

Plausibility check for Labor based Camps

Standard/Reference used for z-score calculation: WHO standards 2006
(If it is not mentioned, flagged data is included in the evaluation. Some parts of this plausibility report are more for advanced users and can be skipped for a standard evaluation)

Overall data quality

Criteria	Flags*	Unit	Excel.	Good	Accept	Problematic	**Score**
Flagged data (% of out of range subjects)	Incl	%	0-2.5 0	>2.5-5.0 5	>5.0-7.5 10	>7.5 20	**0** (0.8 %)
Overall Sex ratio (Significant chi square)	Incl	p	>0.1 0	>0.05 2	>0.001 4	<=0.001 10	**4** (p=0.030)
Age ratio(6-29 vs 30-59) (Significant chi square)	Incl	p	>0.1 0	>0.05 2	>0.001 4	<=0.001 10	**0** (p=0.338)
Dig pref score - weight	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	**0** (7)
Dig pref score - height	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	**4** (13)
Dig pref score - MUAC	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	**2** (10)
Standard Dev WHZ . .	Excl	SD	<1.1 and >0.9	<1.15 and >0.85	<1.20 and >0.80	>=1.20 or <=0.80	
			0	5	10	20	**0** (1.00)
Skewness WHZ	Excl	#	<±0.2 0	<±0.4 1	<±0.6 3	>=±0.6 5	**0** (-0.17)
Kurtosis WHZ	Excl	#	<±0.2 0	<±0.4 1	<±0.6 3	>=±0.6 5	**0** (-0.15)
Poisson dist WHZ-2	Excl	p	>0.05 0	>0.01 1	>0.001 3	<=0.001 5	**0** (p=)
OVERALL SCORE WHZ =			0-9	10-14	15-24	>25	**10** %

The overall score of this survey is 10 %, this is good.

Appendix 4

Standardisation test results		Precision	Accuracy		OUTCOME
Weight		max	Bias from superv	Bias from median	result
		kg	Bias (kg)	Bias (kg)	
	Supervisor	0.3	-	-0.57	TEM acceptable
	Enumerator 1	0.2	0	-0.56	TEM acceptable
	Enumerator 2	0.3	0	-0.57	TEM acceptable
	Enumerator 3	0.3	-0.01	-0.58	TEM acceptable
	Enumerator 4	0.4	0	-0.57	TEM poor
	Enumerator 5	0.1	-0.04	-0.6	TEM good
Height		max	Bias from superv	Bias from median	result
		cm	Bias (cm)	Bias (cm)	
	Supervisor	1.4	-	-5.03	TEM acceptable
	Enumerator 1	9.5	-0.69	-5.72	TEM reject
	Enumerator 2	1	-0.22	-5.25	TEM good
	Enumerator 3	4	-0.22	-5.25	TEM poor
	Enumerator 4	1.6	0.1	-4.93	TEM poor
	Enumerator 5	3.3	-0.1	-5.13	TEM poor
MUAC		max	Bias from superv	Bias from median	result
		mm	Bias (mm)	Bias (mm)	
	Supervisor	9	-	-13.91	TEM poor
	Enumerator 1	6	0.32	-13.59	TEM good
	Enumerator 2	8	1.09	-12.82	TEM poor
	Enumerator 3	7	0.09	-13.82	TEM acceptable
	Enumerator 4	10	0.82	-13.09	TEM poor
	Enumerator 5	6	-0.14	-14.05	TEM good

Appendix 5

List of individuals involved in the survey

Survey coordination

1. Muktar Ismail Issack

Name of the supervisor

1. Omar Mohamed
2. Dr. Badrudin Badawi
3. Raja Mohammed
4. Amajad Mahjoup

Name of the Enumerators

1. Sara Ibrahim Abdalla
2. Abulqasim Ibrahim
3. Fiyor Bereki
4. Nahia Adam
5. Mousab Ibrahim
6. Mohamed Adem
7. Hanan Mahmoud
8. Abeer Ahmed
9. Mariam Ideres Sead
10. Osman Mohamud
11. Yousuf Hamaza
12. Alamin Osman
13. Nahid Hamza
14. Malaz Ahmed
15. Ali ahmed
16. Maha Mohamed
17. Ahmed Mohammed
18. Samah Salin
19. Amouna Mohamed

20. Badria Mohamed
21. Nasir Hassan
22. Fatuma Abdul
23. Daffalla Ah Ohaj
24. WAli Ibrahim

Appendix 6

Timeline for the nutrition survey data collection

Date	Camp Name	Sample size	Distance	No of days in each camp
1 -2 June 2015	Abuda	99 HHs	193 km	2
03 - 06 June 2015	Umugurgur	317 HHs	150 km	4
7 – 10 June 2015	Shagrab 1	430 HHs	115 km	4
11 -12 June 2015	Shagrab 2	180 HHs	120 km	2
13 June 2015	Shagrab 3	75 HHs	125 km	1
14 June 2015	Kilo 26	104 HHs	110 km	1
15 -16 June 2015	Girba/Fau 5	66 HHs	82 km	2
17 -18 June 2015	Wadsharefy	221 HHs	20 km	2
Total days				18 days

Appendex 7

UNHCR Standardised Expanded Nutrition Survey (SENS) Questionnaire for East Sudan

English/Arabic

WASH: 1 questionnaire per household *(*THIS QUESTIONNAIRE IS TO BE ADMINISTERED TO THE MAIN CARETAKER OR, IF THEY ARE ABSENT, ANOTHER ADULT MEMBER OF THE HOUSEHOLD)

Zone:_____ **Block** : _____**Consent** : yes / no / absent
رق م الـ قطاع رقم الحي هل الاسره موافقه علي المقابله

ZONE **BLOCK** **WSCONST**

Date of interview (dd/mm/yyyy) تاريخ المقابله **SURVDATE**	
|___|___|/|___|___|/|___|___||___|___|	|___|___|
Team Number رقم التيم **TEAM**	**HH Number** رقم الاسره **HH**
|___|	|___|___|___|

No	QUESTION	ANSWER CODES	
SECTION WS1			
WS1	How many people live in this household and slept here last night? كم عدد افراد الاسره الذين باتو في المنزل ليله امس **HHSIZE**	|___|___|	
WS2	What is the ***main*** source of drinking water for members of your household? ماهو مصدر المياه الرئيسي لافراد الاسره **SOURCE**	Piped water..... 01 مياه الخطوط Public tap/standpipe ..... 02 حنفيه عامه Tube well/borehole (& pump) ..... 03 ابار جوفيه Protected dug well..... 04 بئر محميه Protected spring ..... 05 حفير محميه Rain water collection ..... 06 تجميع مياه الامطار UNHCR Tanker ..... 07 نتنكر مياه المفوضيه Unprotected spring ..... 08 حفير غير محمي Unprotected dug well..... 09 حفاير غير محميه	|___|___|

		Small water vendor ..... 10 مياه مباعه بالجركانات Tanker truck ..... 11 تناكر شاحنات Bottled water ..... 12 مياه معاءة في قوارير Surface water (e.g. river, pond) ..... 13 مياه سطحيه Other ..... 96 مصادر اخري Don't know ..... 98 لا اعلم	
WS3	Are you satisfied with the water supply? THIS RELATES TO THE DRINKING WATER SUPPLY هل انت راضي امداد المياه **SATISFY**	Yes ..... 1 نعم No ..... 2 لا Partially ..... 3 جزائيا Don't know ..... 8 لااعلم	|___| **IF ANSWER IS 1, 3 OR 8 GO TO WS5**
WS4	What is the ***main*** reason you are not satisfied with the water supply? ماهو السبب الرئيسي لعدم الرضا في امدد المياه **REASON**	Not enough ..... 01 غير كافي Long waiting queue ..... 02 الانتظار الطويل Long distance ..... 03 مسافه طويله Irregular supply ..... 04 امداد المياه غير منتظم Bad taste ..... 05 الطعم سيئه Water too warm ..... 06 الماء الدافئ جدا Bad quality ..... 07 النوعيه غير جيده Have to pay ..... 08 يجب علي أن أدفع Other (specify) ..... 96 اخري Don't know ..... 98 لااعلم	
WS5	What kind of toilet facility does this household use? ماهو نوع دوره المياه الموجوده بالمنزل **TOILET**	Flush to piped sewer system ..... 01 حمامات مربوطه بنظام صرف صحي Flush to septic system ..... 02 مربوط بنظام شفاط Pour-flush to pit ..... 03 شفاط للحفره VIP/simple pit latrine with floor/slab ..... 04 حمامات نخبه مزوده بسطح خرساني Composting/dry latrine ..... 05 حمامات جافه Flush or pour-flush elsewhere ..... 06 حمامات مزوده بنظام تصرسف الي مكان اخر Pit latrine without floor/slab ..... 07 حفره غير مغطيه بسطح خرساني Service or bucket latrine ..... 08 دلو مرحاض Hanging toilet/latrine 09	|___|___| **IF ANSWER IS 10 GO TO WS7**

		شنقا المرحاض No facility, field, bush, plastic bag ..... 10 لاتوجد حمامات في المنزل	
WS6	How many ***households*** share this toilet?	RECORD NUMBER OF HOUSEHOLDS IF KNOWN (RECORD 96 IF PUBLIC TOILET OR 98 IF UNKNOWN) اكتب عدد الاسره لو وجد لو كان دورات عامه اكتب(96)لوكان لا اعلم اكتب(89) **TOILSHR**	|___|___| Households
		SUPERVISOR SELECT ONE ONLY Not shared (**1 HH**) ..... 1 Shared family (**2 HH**) ..... 2 Communal toilet (**3 HH or more**) ..... 3 Public toilet (**in market or clinic etc**.)..... 4 Don't know..... 8 **TOILSHR_c**	|___|
WS7	Do you have children under three years old? هل لديك اطفال اقل من ثلاثة سنوات **CHILD**	Yes..... 1 نعم No ..... 2 لا	|___| **IF ANSWER IS 2 GO TO WS9**
WS8	The last time [NAME OF YOUNGEST CHILD] passed stools, what was done to dispose of the stools? اخر مره تبرزه فيها -(ذكر اسم اصغر طفل) ماذا فعلتي للتخاص من البراز **STOOL**	Child used toilet/latrine ..... 01 الطفل الذي يستخدم الحمام Put/rinsed into toilet or latrine..... 02 ترمي في الحمام Buried ..... 03 تدفن في الارض Thrown into garbage..... 04 ترمي في الزباله Put/rinsed into drain or ditch..... 05 ترمي الجدول Left in the open..... 06 يترك في العراء Other..... 96 اخري Don't know ..... 98 لااعلم	|___|___|

SECTION WS2
Observation Based Questions (*done after the initial questions to ensure the flow of the interview is not broken*)

No	OBSERVATION / QUESTION	ANSWER			
WS9	CALCULATE THE TOTAL AMOUNT OF WATER USED BY THE HOUSEHOLD PER DAY THIS RELATES TO ALL SOURCES OF WATER (DRINKING WATER AND NON-DRINKING WATER SOURCES)	Please show me the containers you used yesterday for collecting water من فضلك ارني عبوات المياه المستخدمه ليوم امس ASSIGN A NUMBER TO EACH CONTAINER	Capacity in litres كم سعة الجركانات باللتر	Number of journeys made with each container عدد المرات لكل عبوة	Total litres
		1			
		2			

	LITRE	3			
		4			
		5			
		6			
		7			
		8			
		9			
		10			
		Total litres used by household			
WS10	Please show me where you store your drinking water. من فضلك ارني اين تخذن مياه الشرب ARE THE DRINKING WATER CONTAINERS COVERED OR NARROW NECKED? هل حافظات المياه مغطيه او لها عنق ضيق **STORE**	All are .....1 كلهم Some are..... 2 بعض منهم None are..... 3 لاشئ			|____|

MOSQUITO NET COVERAGE: 1 questionnaire per household (THIS QUESTIONNAIRE IS TO BE ADMINISTERED TO THE HEAD OF THE HOUSEHOLD OR, IF THEY ARE ABSENT, ANOTHER ADULT MEMBER OF THE HOUSEHOLD.

Zone:_____ **Block** : _____**Consent** : yes / no / absent
رقم الـ قطاع رقم الحي هل الاسره موافقه علي المقابله

ZONE **BLOCK** **WSCONST**

Date of interview (dd/mm/yyyy) تاريخ المقابله **SURVDATE**	
|___|___|/|___|___|/|___|___||___|___|	|___|___|
Team Number رقم التيم **TEAM**	**HH Number** رقم الاسره **HH**
|___|	|___|___|___|

No	QUESTION		ANSWER CODES		
SECTION TN1					
TN1	How many people live in this household and slept here last night? كم عدد افراد الاسره الذينه قضوا اليله ف السابقه في المنزل ادخل العدد **TOTHH**				|___|___|
TN2	How many children 0-59 months live in this household and slept here last night? كم عدد الاطفال الاقل من 5 اعوام من الاسره وقضوا اليله السابقه في المنزل ادخل العدد **TOTCH**				|___|___|
TN3	How many pregnant women live in this household and slept here last night? كم عدد الحوامل من الاسره وقضوا اليله هنا ادخل العدد **TOTPW**				|___|___|
TN4	Do you have mosquito nets in this household that can be used while sleeping? هل لديكم ناموسيه تستخدم اثاء النوم **MOSNETS**		Yes ..... 1 نعم No..... 2 لا		|___| **IF ANSWER IS 2 STOP NOW**
TN5	How many of these mosquito nets that can be used while sleeping does your household have? كم عدد هذه الناموسيات تمكن اتستعمل اثناء النوم ادخل العدد **NUMNETS**		IF MORE THAN 4 NETS, ENTER THE NUMBER AND USE ADDITIONAL NET QUESTIONNAIRE SHEETS ENTERING THE NUMBER OF THE NETS SEQUENTIALLY AT THE TOP		|___| Nets
TN6	ASK RESPONDENT TO SHOW YOU THE NET(S) IN THE HH. IF NETS ARE NOT OBSERVED → CORRECT TN6 ANSWER ملاحظات الناموسيات	NET #|___|	NET #|___|	NET #|___|	NET #|___|
TN7	OBSERVE NET AND RECORD THE BRANDNAME OF NET ON THE TAG. IF NO TAG EXISTS OR IS UNREADABLE RECORD 'DK' FOR DON'T KNOW.				
TN8	**For surveyor/supervisor only (not to be done during**	1=LLIN 2=Other/DK	1=LLIN 2=Other/DK	1=LLIN 2=Other/DK	1=LLIN 2=Other/DK

	interview): WHAT TYPE OF NET IS THIS? BASED ON THE TAG INDICATE IF THIS IS A LLIN OR OTHER TYPE OF NET OR DON'T KNOW.	|___| **LNTYPE1**	|___| **LNTYPE2**	|___| **LNTYPE3**	|___| **LNTYPE4**
TN9	**For surveyor/supervisor only (not to be done during interview)**: RECORD THE TOTAL NUMBER OF LLINs IN HH BY COUNTING THE NUMBER OF '1' IN TN9. **TOTLN**				|___| LLINs

SECTION TN2								
Line no	**Household members**	**Sex**	**Age**	**Pregnancy status**	**Slept under net**	**Which net**		**Type of net**
#	**COL1**	**COL 2**	**COL3**	**COL4**	**COL5**	**COL6**		**COL7**
	Please give me the names of the HH members who live here and who slept here last night	Sex m/f	Age years	FOR WOMEN 15-49 YEARS, ASK: Is (NAME) currently pregnant? (CIRCLE not applicable '99' if female <15->49 years or male) Yes No/DK N/A	Did (NAME) sleep under a net last night? Yes No/DK	ASK THE RESPONDENT TO PHYSICALLY IDENTIFY WHICH OF THE OBSERVED NETS THEY SLEPT UNDER. CIRCLE THE NUMBER CORRESPONDING TO THE NET THEY USED. net#1 net#2 net# 3 net#4	**For surveyor/supervisor only:** BASED ON THE OBSERVED NET BRANDNAME RECORDED (TN8) INDICATE IF IT IS AN LLIN OR OTHER OR UNKNOWN (DK) LLIN OTHER/DK
01		m f	<5 ≥5	1 0 99	1 0	1 2 3 4		1 2
02		m f	<5 ≥5	1 0 99	1 0	1 2 3 4		1 2
03		m f	<5 ≥5	1 0 99	1 0	1 2 3 4		1 2
04		m f	<5 ≥5	1 0 99	1 0	1 2 3 4		1 2
05		m f	<5 ≥5	1 0 99	1 0	1 2 3 4		1 2
06		m f	<5 ≥5	1 0 99	1 0	1 2 3 4		1 2
07		m f	<5 ≥5	1 0 99	1 0	1 2 3 4		1 2
08		m f	<5 ≥5	1 0 99	1 0	1 2 3 4		1 2
09		m f	<5 ≥5	1 0 99	1 0	1 2 3 4		1 2
10		m f	<5 ≥5	1 0 99	1 0	1 2 3 4		1 2
11		m f	<5 ≥5	1 0 99	1 0	1 2 3 4		1 2

12		m f	<5 ≥5	1	0	99	1	0	1	2	3	4	1	2
13		m f	<5 ≥5	1	0	99	1	0	1	2	3	4	1	2
14		m f	<5 ≥5	1	0	99	1	0	1	2	3	4	1	2
15		m f	<5 ≥5	1	0	99	1	0	1	2	3	4	1	2

Mosquito net summary (for surveyor/supervisor only, not to be done during interview)							
	Total HH members		**Total <5**		**Total Pregnant**		
Slept under a net of any type	Count the number of '1' in COL5	**TN11** |___|___| **TOTSLPNT**	For children < 5 (COL3 is '<5'), count the number of '1' in COL5	**TN13** |___|___| **TOTCHNT**	For pregnant women (COL4 is '1'), count the number of '1' in COL5	**TN15** |___|___| **TOTPWNT**	
Slept under an LLIN	Count the number of '1' in COL7	**TN12** |___|___| **TOTSLPLN**	For children <5 (COL3 is '<5'), count the number of '1' in COL7	**TN14** |___|___| **TOTCHLN**	For pregnant women (COL4 is '1'), count the number of '1' in COL7	**TN16** |___|___| **TOTPWLN**	

WOMEN ANAEMIA: 1 questionnaire per cluster / zones / sections (THIS QUESTIONNAIRE IS TO BE ADMINISTERED TO ALL WOMEN AGED BETWEEN 15 AND 49 YEARS IN THE SELECTED HOUSEHOLD)

Zone:_____ **Block** : _____**Consent** : yes / no / absent
رقم الحي هل الاسره موافقه علي المقابله

ZONE **BLOCK** **WSCONST**

Date of interview (dd/mm/yyyy) تاريخ المقابله **SURVDATE**					**Team Number** رقم التيم **TEAM**			
WM1	**WM2**	**WM3**	**WM4**	**WM5**	**WM6**	**WM7**	**WM8**	**WM9**
ID	**HH No** رقم الاسره **HH**	**Consent given** اتم القبول 1=yes نعم 2=no لا 3=absent غايب	**Age** (years) العمر بالسنوات	**MUAC (in mm)** المواك بالملميتر اخذ المواك ب mm	**Are you pregnant?** هل انتي حامل 1=yes نعم 2=no لا 8=Dont know لااعرف	**Are you currently enrolled in the ANC programme?** هل تزهبي لمتابعه الحوامل حاليا 1=yes نعم 2=no لا 8=Dont know لااعرف	**Are you currently receiving iron-folate pills (*SHOW PILL*)?** هل تأخذين حبوب الفولك والحديد حاليا 1=yes نعم 2=no لا 8=Dont know لااعرف	**Hb** الهموقلوبين جرام/ديسليتر (g/L or g/dL)
WMID	**HH**	**WMCONST**	**WMAGE**	**MUACW**	**PREGNANT**	**ANC**	**FEREC**	**WMHB**
01								
02								
03								
04								
05								
06								

07								
08								
09								
…								

CHILDREN 6-59 MONTHS ANTHROPOMETRY, HEALTH AND ANAEMIA: 1 questionnaire per cluster / zones / sections *(*THIS QUESTIONNAIRE IS TO BE ADMINISTERED TO ALL CARETAKERS OF A CHILD THAT LIVES WITH THEM AND IS BETWEEN 6 AND 59 MONTHS OF AGE*)*

Zone:_____ **Block** : _____**Consent** : yes / no / absent
رقم الـ قطاع رقم الحي هل الاسره موافقه علي المقابله

ZONE **BLOCK** **WSCONST**

Date of interview (dd/mm/yyyy) تااريخ المقابله **SURVDATE**				**Team Number** رقم التيم **TEAM**										
CH1	**CH2**	**CH3**	**CH4**	**CH5**	**CH6**	**CH7**	**CH8**	**CH9**	**CH10**	**CH11**	**CH12**	**CH13**	**CH14**	**CH15**
ID	**HH** رقم المنزل	**Consent given** هل الاسره موافقه علي اخذ القياسات الجسمانيه 1=yes نعم 2=no لا 3=absent غياب	**Sex** النوع (m/f) زكر/ انثي	**Birthdate*** تاريخ الميلاد dd/mm/yyyy	**Age**** (months) ادخل عمر الطفل بالشهور	**Weight** (kg) الوزن بالكيلوجرام	**Height** (cm) الطول بالسنتمتير	**Oedema** الورم (y/n)	**MUAC** (mm) المواك بالملميتر	**Child enrolled** هل الطفل حاليا في برنامج التغذيه 1=SFP تغذيه اضافيه 2=TFP تغذيه علاجيه 3=None لاشيي	**Measles** حصبه 1=yes card نعم لديه كرت 2=yes recall نعم اتزكر 3=no or don't know لا /لا اعلم	**Vit. A in past 6 months** (SHOW CAPSULE) ارجع لاخر جرعه وقائيه خلال 6 اشهر من يوم المسح نوعية اكبسولات قيتامين(أ) 1=yes card نعم لديه كرت 2=yes recall نعم اتزكر 3=no or don't know لا /لا اعلم	**Diarrhoea in past 2 weeks** الاسهال قبل اسبوعين من تاريخ المسح 1=yes نعم 2=no لا 3=DK لااعرف	**Hb** *(g/dL)* الهمقلوبين جرام/ديسلي تر

ID	HH	CHCONST	SEX	BIRTHDAT	MONTHS	WEIGHT	HEIGHT	EDEMA	MUAC	ENROL	MEASLES	VITA	DIAR	CHHB
01				/ /										
02				/ /										
03				/ /										
04				/ /										
06				/ /										
…				/ /										

*The exact birth date should only be taken from an age documentation showing day, month and year of birth. It is only recorded if an official age documentation is available; if the mother recalls the exact date, this is not considered to be reliable enough. **Leave blank if no official age documentation is available.**
**If no age documentation is available, estimate age using local event calendar. If an official age documentation is available, record the age in months from the date of birth.

IYCF: 1 questionnaire per child 0-23 months (THIS QUESTIONNAIRE IS TO BE ADMINISTERED TO THE MOTHER OR THE MAIN CAREGIVER WHO IS RESPONSIBLE FOR FEEDING THE CHILD AND THE CHILD SHOULD BE BETWEEN 0 AND 23 MONTHS OF AGE)

Zone:_____ **Block** : _____**Consent** : yes / no / absent
رقم الا قطاع رقم الحي هل الاسره موافقه علي المقابله

ZONE **BLOCK** **WSCONST**

Date of interview (dd/mm/yyyy) تاريخ المقابله		
|___|___|/|___|___|/|___|___||___|___| **SURVDATE**		
Team Number رقم التيم	**ID Number**	**HH** رقم المنزل
|___| **TEAM**	|___|___|___| **ID**	|___|___|___| **HH**

No	QUESTION	ANSWER CODES	
SECTION IF1			
IF1	Sex النوع **SEX**	Male .....1 زكر Female .....2 انثي	|___|
IF2	Birthdate RECORD FROM AGE DOCUMENTATION. LEAVE BLANK IF NO VALID AGE DOCUMENTATION تاريخ الميلاد **BIRTHDAT**	Day/Month/Year…..|___|___| /|___|___| / |___|___||___|___|	
IF3	Child's age in months ادخل عمر الطفل بالشهور **MONTHS**	IF AGE DOCUMENTATION NOT AVAILABLE, ESTIMATE USING EVENT CALENDAR. IF AGE DOCUMENTATION AVAILABLE, RECORD THE AGE IN MONTHS FROM THE DATE OF BIRTH	|___|___|
IF4	Has [NAME] ever been breastfed? هل الطفل رضع من قبل **EVERBF**	Yes.....1 نعم No .....2 لا Don't know .....8 لااعرف	|___| **IF ANSWER IS 2 or 8 GO TO IF7**
IF5	How long after birth did you first put [NAME] to the breast? بعد كم من االولاده رضعت (اسم الطفل) من الثدي **INITBF**	Less than one hour .....1 اقل من ساعه Between 1 and 23 hours.....2 بين 1 - 23ساعه More than 24 hours.....3 اكبر من او يساوي 24 ساعه DK .....8 لا اعرف	|___|
IF6	Was [NAME] breastfed yesterday during the day or at night? هل رضع (اسم الطفل) امس اثناء االنهار او الليل **YESTBF**	Yes.....1 نعم No .....2 لا Don't know .....8 لااعرف	|___|

SECTION IF2					
IF7	Now I would like to ask you about liquids that [NAME] may have had yesterday during the day and at night. I am interested in whether your child had the item even if it was combined with other foods. Yesterday, during the day or at night, did [NAME] receive any of the following? الان اريد اسألك عن السوائل التي تنالها(اسم الطفل)في اليوم او الليله السابقه انا اود ان اعرف حتي لو كان مخلوط ببعض الطعام		Yes	No	DK
	7A. Plain water ماء **WATER**	7A.....1	2	8	
	7B. Infant formula: for example [**add locally available brand names of *fortified* and *non-fortified* infant formula**] مركبات الالبان الصناعيه **INFORM**	7B.....1	2	8	
	7C. Milk such as tinned, powdered, or fresh animal milk: for example [**add locally available brand names of tinned and powdered milk**] البان سواء كانت بدره او لبن حيواني طازج **MILK**	7C.....1	2	8	
	7D. Juice or juice drinks [**add locally available brand names of juice drinks**] عصائره طازجه اوبدره **JUICE**	7D.....1	2	8	
	7E. Clear broth شوربه صافيه **BROTH**	7E.....1	2	8	
	7F. Sour milk or yogurt for example: [**add local names of yogurt**] زبادي **YOGURT**	7F.....1	2	8	
	7G. Thin porridge for example: **[use local names]** مديده خفيفه **THINPOR**	7G.....1	2	8	
	7H. Tea or coffee with milk شاي اوقهو بالبن **WHTEACOF**	7H.....1	2	8	
	7I. Any other water-based liquids [**list other water-based liquids available in the local setting**]: for example sodas, other sweet drinks, herbal infusion, gripe water, clear tea with no milk, black coffee, ritual Fluids اي سوئل اخري مثل المياه الغازيه اوالمشروبات الحلوة اوشاي -قهوة **WATLQD**	7I.....1	2	8	
IF8	Yesterday, during the day or at night, did [NAME] eat solid or semi-solid (soft, mushy) food? النهار مس اثناء اوا اليله ا(اسم الطفل)هل تناول الطفل غذاء صلب او شبه صلب **FOOD**	Yes.....1 نعم No.....2 لا Don't know.....8 لااعرف	|___|		
IF9	Yesterday, during the day and night, how many times did [NAME] eat solid or semi-solid (soft, mushy) food? كم مره تناول ا(اسم الطفل)طعام صلب او شبه صلب امس اثناء النهار واليله	|___| (Enter number)			

SECTION IF3			
IF10	Did [NAME] drink anything from a bottle with a nipple yesterday during the day or at night? هل (اسم الطفل)شرب اي سوائل بواسطة الضاعه (البيزه) **BOTTLE**	Yes……1 نعم No……2 لا Don't know…..8 لااعرف	|___|
SECTION IF4			
IF11	Now I would like to ask you about some particular foods [NAME] may eat. I am interested in whether your child had the item even if it was combined with other foods. Yesterday, during the day or at night, did [NAME] consume any of the following? الان اريد ان اسأل عن ا بعض االاطعمه المعينه تيمكن ان يكون(اسم الطفل) قد اكلها		

		Yes	No	DK
	11A. **Flesh foods [list common meat, fish, poultry and liver/organ flesh foods used the local setting**] for example: beef, goat, lamb, mutton, pork, rabbit, chicken, duck, liver, kidney, heart الاطعمه الطازجه مثل اللحوم لااسماك والدجاج و الكبده والكلاوي **FLESHFD**	11A……..1	2	8
	11B. **Grains, roots or tubers [list common grains, roots and tubers used in the local setting**] for example: maize, wheat, sorghum, bread, white potatoes, white yams, cassava الحبوب والجزريات و الدرنيات مثل عيشريف قمح و زره بطاطس **GRAINROOT**	11B……..……1	2	8
	11C. **Legumes and nuts [list common legumes and nuts used in the local setting**] for example: beans, peas, lentils, nuts or seeds البقوليات مثل العدس والفول السوداني و الفول المصري **LEGUME**	11C……..……1	2	8
	12D. **Dairy products [list common dairy products used the local setting**] for example: milk, yoghurt, cheese حليب جبن زبادي **DAIRY**	11D……..……1	2	8
	12E. **Eggs [**Any eggs from chicken, duck, guinea fowl or any other egg] البيض **EGGS**	11E……..……1	2	8
	12F. **Vitamin A rich fruits and vegetables [list common Vitamin-A rich fruits and vegetables used the local setting**] for example: pumpkin, carrots, squash, sweet potatoes that are orange inside, dark green leafy vegetables, ripe mangoes, ripe papaya and 100% fruit juice made from these, red palm oil, palm nut الخصروات ا والفواكه لغنيه بفايتمين (أ) الجزر و البطاطا الحلوه و القرع الشمام و المنقه **VITARICH**	11F……..……1	2	8
	12G. **Other fruit and vegetables [list other fruits and vegetables used the local setting**] for example: cabbage, green pepper, tomato, onion, eggplant **,** apple, avocados, banana, coconut flesh, lemon, , including wild fruits and 100% fruit juice made from these فواكه وخضروات اخري **OTHFRUIT**	11G……..……1	2	8

	12H. **FBF++ [list FBF++ available in the local setting]** : for example CSB++ الاطعمه المحسنه بواسطة الخلط بمواد اخري مثل الفافا **FBFSUPER**	11H……1	2	8
	12I. **RUTF [list RUTF products available in the local setting]**: for example Plumpy'Nut® and eeZeePaste™ (SHOW SACHET) الوجبه الغذائيه الجاهزه **RUTF**	11I……1	2	8
	12J. **LNS [list LNS products available in the local setting]**: for example Nutributter® and Plumpy'doz® (SHOW SACHET / POT) الوجبه الجاهزه الوقائيه **LNS**	11J……...1	2	8
	12K .Infant formula: for example [ADD LOCALLY AVAILABLE BRAND NAMES OF IRON FORTIFIED INFANT FORMULA] مركب التغذيه المحسنه للاطفال اقل منسنه(امضاف لها الحديد)	11K……...1	2	8

Appendix 8

East Sudan 2015 SENS_Events calendar

Religious holidays العطلات الدينية	National events المناسبات الوطنية	Other events, seasons	Date التاريخ	Age العمر
		World refugee day يوم اللاجئ العالمي	Jun-15	0
		Land preparation اعداد الارض	May-15	1
		Wheat harvest حصاد القمح	Apr-15	2
		Wheat harvest حصاد القمح	Mar-15	3
			Feb-15	4
Mawlid al-Nabi 3 January	Independence day-Sudan عيد استقلال لدولة السودان		Jan-15	5
			Dec-14	6
		Harvest حصاد	Nov-14	7
Muharram 25 October		Harvest حصاد	Oct-14	8
		Rainy season اوان المطر	Sep-14	9
		Rainy season اوان المطر	Aug-14	10
Eid Al Fatur 28 July		بداية موسم الخريف	Jul-14	11
Beginning of Ramadan 28 June 28/06 /بداية شهر رمضان		World refugee day يوم اللاجئ العالمي	Jun-14	12
	Independence-Eritrea 24 May24/05	Land preparation اعداد الارض	May-14	13
		Wheat harvest حصاد القمح	Apr-14	14
		حصاد القمح	Mar-14	15
			Feb-14	16
Mawlid al-Nabi 13 January	Independence day-Sudan	Millet and sorghum harvest حصاد الدخن والزرة	Jan-14	17
		حصاد الدخن والزرة	Dec-13	18
Muharram 5 November		Millet and sorghum harvest حصاد الدخن والزرة	Nov-13	19
			Oct-13	20
		Rainy season موسم الخريف	Sep-13	21
Eid Al Fatur 8 August	/08/08 عيد الفطر	Rainy season موسم الخريف	Aug-13	22
Beginning of Ramadan 9 July		Start of rainy season بداية موسم الخريف	Jul-13	23
		World refugee day يوم اللاجئ العالمي	Jun-13	24
	Independence-Eritrea استقلال ارتريا	Land preparation اعداد الارض	May-13	25
		Wheat harvest حصاد القمح	Apr-13	26
		Wheat harvest حصاد القمح	Mar-13	27
			Feb-13	28
Mawlid al-Nabi 24 January	Independence day-Sudan		Jan-13	29
		Millet and sorghum harvest حصاد الدخن والزرة	Dec-12	30
Muharram 15 November		Millet and sorghum harvest حصاد الدخن والزرة	Nov-12	31

Religious holidays العطلات الدينية	National events المناسبات الوطنية	Other events احداث اخري	Date التاريخ	Age العمر
			Oct-12	32
		Rainy season موسم الخريف	Sep-12	33
Eid Al Fatur 19 August	19/08 عيد الفطر	Rainy season موسم الخريف	Aug-12	34
Beginning of Ramadan 20 July	/بداية رمضان20 يوليو	Start of rainy season بداية موسم الخريف	Jul-12	35
		World refugee day يوم اللاجي العالمي	Jun-12	36
	Independence-Eritrea	Land preparation اعداد الارض	May-12	37
		Wheat harvest حصاد القمح	Apr-12	38
		Wheat harvest حصاد القمح	Mar-12	39
Mawlid al-Nabi 4 February			Feb-12	40
	Independence day-Sudan	Millet and sorghum harvest حصاد الدخن والزرة	Jan-12	41
		Millet and sorghum harvest حصاد الدخن والزرة	Dec-11	42
Muharram 26 November	محرم 26 نوفمبر	Millet and sorghum harvest حصاد الدخن والزرة	Nov-11	43
			Oct-11	44
		Rainy season موسم الخريف	Sep-11	45
Eid Al Fatur 30 August	/30/08 عيد الفطر	Rainy season موسم الخريف	Aug-11	46
Beginning of Ramadan 11 August	/11/08 بداية رمضان	Start of rainy season بداية موسم الخريف	Jul-11	47
		World refugee day يوم اللاجي العالمي	Jun-11	48
	Independence-Eritrea	Land preparation اعداد الارض	May-11	49
		Wheat harvest حصاد القمح	Apr-11	50
		Wheat harvest حصاد القمح	Mar-11	51
Mawlid al-Nabi 15 February	مولد النبي 15/فبراير		Feb-11	52
	Independence day-Sudan	Millet and sorghum harvest حصاد الدخن والزرة	Jan-11	53
Muharram 7 December		Millet and sorghum harvest حصاد الدخن والزرة	Dec-10	54
		Millet and sorghum harvest حصاد الدخن والزرة	Nov-10	55
			Oct-10	56
Eid Al Fatur 10 September	عيد الفطر 10 سبتمبر	Rainy season موسم الخريف	Sep-10	57
Beginning of Ramadan 11 August	/11/08 بداية رمضان	Rainy season موسم الخريف	Aug-10	58
		Start of rainy season بداية موسم الخريف	Jul-10	59