FINAL REPORT

STANDARDIZED EXPANDED NUTRITION SURVEY (SENS)
White Nile State South Sudanese Refugee Camps-Sudan

Khor Alwaral, Um Sangour , Al Radis 1 & 2, El Kashafa, Jouri, and Alagaya & Dabat Bosin camps

Survey conducted: 26th March to 19th April 2018
Final Report completed: August 2018

Written by: Samuel Tadesse Beyene, Nutrition and Food Security Officer, UNHCR Khartoum
Reviewed by: Naser Mohmand, Senior Regional Nutrition and Food Security officer UNHCR, Nairobi
                    Nasur Muwonge, Health and Nutrition Officer UNHCR, Khartoum

Jointly implemented by: UNHCR, UNICEF, WFP, WHO, SMOH, COR, HAC, SRCS and GHF

Acknowledgement

We take this opportunity to thank the UNHCR management at various levels for providing financial, human and logistical support for the survey to happen. Special thanks go to UNHCR regional office technical support and providing guidance and remote assistance at various stages of the survey.

Our gratitude goes to WFP, WHO and UNICEF in collaboration with the Ministry of Health (MoH) for supporting the survey, assigning survey supervisors and contribution of vehicles for survey team transportations.

Special thanks extended to the staff of COR, SRCS, HAC, GHF for their facilitation and dedicated support in the eight camps. COR camp managers facilitated community mobilization, hosting survey teams in the camp for overnight stay and ensuring safety and security of the teams. HAC/NISS supported survey in accessing fuel for the survey team cars, ensuring securities throughout survey period.

Sincere thanks go to all drivers who supported the survey with enthusiasm working long hours starting early in the morning to late hours in mobilizing the survey team and logistics. Particular thanks extended to refugee leaders and community volunteers in the eight camps for their support in community mobilization and awareness raising prior to the survey period.

We express our gratitude to refugee communities in all the camps for their participation and allowing their children and women to be measured and responding to various questions in the tools used by the survey team.

Table of Content

Lists of Acronyms

ANC	Antenatal Care
BSFP	Blanket Supplementary Feeding Program
CDC	Centers for Disease Control and Prevention
CDR	Crude Death Rate
CI	Confidence Interval
COR	Coordination of Refugees
ENA	Emergency Nutrition Assessment
EPI	Expanded Programme on Immunization
Epi Info	Name of CDC software for epidemiological investigations
GAM	Global Acute Malnutrition
GFD	General Food Distribution
GHF	Global Health Foundation
HAC	Humanitarian Aid Coordination
HAZ	Height-for-Age Z-score
HFA	Height-for-Age
IYCF	Infant and young child feeding
Kcal	Kilocalorie
Kg	Kilogram
LLIN	Long Lasting Insecticide treated Nets
MAM	Moderate Acute Malnutrition
MSF	Medicine-Sans-Frontiers
MUAC	Mid-Upper Arm Circumference
NCHS	National Centre for Health Statistics
OTP	Outpatient Therapeutic Programme
SAM	Severe Acute Malnutrition
SC	Stabilization Centre
SMART	Standardized Monitoring and Assessment for Relief and Transition
SMOH	Sudan Ministry of Health
SENS	Standardized Expanded Nutrition Survey
SFP	Supplementary Feeding Program
SRCS	Sudan-Red-Crescent-Society
TFP	Therapeutic Feeding Program
TSFP	Targeted Supplementary Feeding Program
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
WASH	Water Sanitation and Health
WFA	Weight-for-Age
WFH	Weight-for-Height
WFP	World Food Program
WHO	World Health Organization
WHZ	Weight-for-Height / Length Z-score

EXECUTIVE SUMMARY

Introduction

Between the 26th of March and 19th April 2018, a standardized expanded nutrition survey (SENS) was conducted in eight camps of south Sudanese refugees in White Nile state (Khor Alwaral, Um Sangour, Al Radis 1&2, El Kashafa, Jouri, Alagaya and Dabat Bosin). The survey followed UNHCR's Standardized Expanded Nutrition Survey (SENS) guidelines for refugee populations. The survey was aimed at assessing the general health, nutrition and mortality indices of refugees in order to formulate action-oriented recommendations for implementation of appropriate nutrition, public health and related interventions.

Objectives of the survey

The main objective of the SENS survey was to assess the general health, nutrition and mortality indices of refugees, in order to formulate action-oriented recommendations for appropriate nutrition, public health and related interventions.

Primary objectives:

a. To determine the prevalence of acute malnutrition among children 6-59 months.
b. To determine the prevalence of stunting among children 6-59 months.
c. To assess the two-week period prevalence of diarrhoea among children 6-59 months.
d. To assess the prevalence of Anaemia among children 6-59 months and women of reproductive age (non-pregnant 15-49 years).
e. To determine the coverage of measles vaccination among children 9-59 months.
f. To determine the coverage of vitamin A supplementation in the last six months among children 6-59 months.
g. To investigate IYCF practices among children 0-23 months.
h. To assess the proportion of households those use an adequate quantity of water per person per day.
i. To determine the population's access to improved water, sanitation and hygiene facilities.
j. To determine the coverage of ration cards and the duration the GFD ration lasts for recipient households.
k. To determine the extent to which negative coping strategies are used by households.
l. To assess household dietary diversity.
m. To determine the utilisation of mosquito nets (all types and LLINs) by the total population, children 0-59 months and pregnant women.
n. To establish recommendations on actions to be taken to address the situation

Secondary objectives:

o. To assess crude and under-five mortality rates in the refugee sites in the last three months.

p. To determine enrolment into Antenatal Care clinic and coverage of iron-folic acid supplementation in pregnant women.

q. To assess the enrolment status of children 6-59 months in to selective feeding programs (OTP/SC and TSFP).

Systematic random sampling method was used to estimate a representative sample of households and children to be measured. All eligible children aged 6-59 months from all selected households were included in the assessment for anthropometry, anaemia, health and children aged 0-23 months were included in the assessment for infant and young child feeding practices. All selected households were assessed for demographic data to estimate the mortality rate. Whereas half of the selected households were considered as representative and assessed for Food Security, WASH, Mosquito net coverage, and women (15-49 years) for HB level measurement (for anaemia determination) and coverage for antenatal care.

A total of six survey teams each consisting of five team members (interpreter, anthropometry measurer, anthropometric assistant, HB data collector and team leader/interviewer) were trained for five days in Kosti. Four camps were further merged into two units/entities, and this decision was based on geographical proximity, demographic and cultural homogeneity and population size. Accordingly, Alagaya and Dabat Bosin were merged into one unit while Al Radis 1 and Al Radis 2 were merged into another unit. In total, six geographical units/camps were assessed. Data collection was carried out over four days in each camp, under the supervision of the Survey Coordinators and supervisors comprising of technical experts from UNHCR, WFP, WHO, UNICEF, SRCS, COR and MoH. Data collection was carried out using Open Data Kit (ODK) through android Tablets. ENA for SMART software (version July 9th, 2015) and Epi-Info software were applied for data analysis. Table 1 below contains a summary of the key SENS findings, followed by interpretation of results and programmatic recommendations based on the findings.

Table 1 : **Summary of key SENS findings White Nile State Camps (Jouri & El Kashafa, Al Radis 1&2, Um Sangour & Alwaral, Alagaya & Dabat Bosin) March-April 2018**

Camps	% (95% CI)						Classification of public health significance / target (where applicable)
	Khor Alwaral	Um Sangour	Al Radis 1&2	El Kashafa	Jouri	Alagaya & Dabat Bosin	
CHILDREN (6-59 months)							
Acute Malnutrition (WHO 2006 Growth Standards)	N=346	N=323	N=325	N=336	N= 349	N= 396	
Global Acute Malnutrition	19.4 %(15.5- 23.9)	16.1% (12.5-20.5)	18.8% (14.9-23.4)	13.1% (9.9-17.1)	14.3% (11.0-18.4)	13.6% (10.6-17.4)	**Critical if ≥ 15%**
Moderate Acute Malnutrition	13.3% (10.1-17.3)	14.2% (10.8-18.5)	16.9% (13.2-21.4)	11.9% (8.9-15.8)	10.6% (7.8-14.3)	12.4% (9.5-16.0)	
Severe Acute Malnutrition	6.1% (4.0-9.1)	1.9% (0.9-4.0)	1.8% (0.8-4.0)	1.2% (0.5-3.0)	3.7% (2.2-6.3)	1.3% (0.5-2.9)	
Oedema	0.3%	0.0%	0.6%	0.0%	0.0%	0.0%	
Stunting (WHO 2006 Growth Standards)							
Total Stunting	12.4% (9.4-16.3)	4.6% (2.8-7.5)	13.8% (10.5-18.0)	8.9% (6.3-12.5)	12.3% (9.3-16.2)	6.6% (4.5-9.4)	**Critical if ≥ 40%**
Severe Stunting	3.2% (1.8-5.6)	0.6% (0.2-2.2)	4.9% (3.1-7.8)	2.4% (1.2-4.6)	3.7% (2.2-6.3)	1.3% (0.5-2.9)	
Mid Upper Arm Circumference (MUAC)							
MUAC <12.5cm	6.6 % (4.5 - 9.8)	5.9 % (3.8 - 9.0)	3.7 % (2.1 - 6.3)	2.7 % (1.4 - 5.0)	3.4 % (2.0 - 5.9)	3.5 % (2.1 - 5.8)	
MUAC 11.5-12.4 cm	4.9 % (3.1 - 7.7)	4.3 % (2.6 - 7.1)	2.8 % (1.5 - 5.2)	2.4 % (1.2 - 4.6)	2.9 % (1.6 - 5.2)	3.0 % (1.7 - 5.2)	
MUAC <11.5 cm	1.7 % (0.8 - 3.7)	1.5 % (0.7 - 3.6)	0.9 % (0.3 - 2.7)	0.3 % (0.1 - 1.7)	0.6 % (0.2 - 2.1)	0.5 % (0.1 - 1.8)	
Anaemia (6-59 months)							
Total Anaemia (Hb <11 g/dl)	46.8% (41.9-51.7)	23.0% (18.7-27.9)	38.4% (33.3-43.8)	38.3% (33.3-43.7)	42.7% (37.7-48.1)	44.8% (39.9-49.7)	**High if ≥ 40%**
Mild (Hb 10-10.9 g/dl)	26.1% (21.7-31.1)	16.5% (12.7-20.8)	21.5% (17.4-26.3)	19.0% (15.2-23.5)	22.1% (18.0-26.8)	24.0% (20.1-28.5)	
Moderate (Hb 7-9.9 g/dl)	17.7% (13.9-22.1)	5.6% (3.6-8.8)	16.3% (12.6-20.7)	19.3% (15.4-23.9)	20.4% (16.4-24.9)	20.5% (16.8-24.7)	
Severe (Hb<7.0 g/dl)	3.0% (1.6-5.4)	0.9% (0.3-2.7)	0.6% (0.1-2.2)	0.0%	0.2% (0.1-1.6)	0.3% (0.04-1.4)	

	% (95% CI)						Classification of public health significance / target (where applicable)
Camps	**Khor Alwaral**	**Um Sangour**	**Al Radis 1&2**	**El Kashafa**	**Jouri**	**Alagaya & Dabat Bosin**	
Program enrolment and Coverage							
Therapeutic program (based on all admission criteria WHZ, Oedema and MUAC)	16.6% (0.4-64.1)	10.0% (0.2-44.5)	71.4% (29.0-96.3)	20.0% (0.5-71.6)	21.4% (4.6-50.8)	28.5% (3.6-57.8)	
Therapeutic program based on Oedema and MUAC only	4.1% (48.9-87.3)	20.0% (0.5-71.6)	66.6% (9.4-99.1)	100.0%	50.0% (1.2-98.7)	(2/2) 100%	
TSFP (based on all admission criteria WHZ, Oedema and MUAC)	62.0% (48.3-74.4)	52.8% (38.6-66.7)	80.0% (67.6-89.2)	83.6% (79.3-87.2)	64.2% (48.0-78.4)	76.6% (63.9-86.6)	
TSFP based on MUAC only	64.7% (38.3-87.5)	14.2% (1.7-42.8)	66.6% (29.9-92.5)	50.0% (15.7-84.3)	30.0% (6.6-65.2)	66.6% (34.8-90.0)	
Measles vaccination with card (9-59 months)	27.4% (22.8-32.6)	24.4% (19.6-29.7)	36.4% (30.9-42.1)	39.0% (33.7-44.6)	32.0% (27.1-37.4)	40.51% (35.5-45.7)	
Measles vaccination with card or recall (9-59 months)	88.9% (85.0-91.9)	86.2% (81.8-89.9)	89.6% (85.7-92.6)	100%	93.7% (90.4-95.8)	94.9% (91.9-96.9)	**Target of ≥ 95%**
Vitamin A supplementation coverage with card, within past 6 months (6-59 months)	26.8% (22.4-31.7)	24.7% (20.3-29.7)	33.5% (28.6-38.8)	32.4% (27.6-37.6)	27.3% (22.8-32.2)	37.6% (33.0-42.5)	
Vitamin A supplementation coverage with card or recall, within past 6 months (6-59 months)	86.9% (83.0-90.1)	74.9% (69.9-79.3)	91.0% (87.4-93.7)	100%	82.4% (78.1-86.1)	94.2% (91.3-96.2)	**Target of ≥ 90%**
Morbidity							
Diarrhoea in the past 2 weeks	12.7% (9.6-16.6)	23.8% (19.5-28.7)	24.7% (20.3-29.7)	12.5% (9.3-16.4)	21.8% (17.8-26.4)	15.9% (12.6-19.8)	

Camps	% (95% CI)						Classification of public health significance / target (where applicable)
	Khor Alwaral	Um Sangour	Al Radis 1&2	El Kashafa	Jouri	Alagaya & Dabat Bosin	
CHILDREN (0-23 months)							
Infant and Young children Feeding Practices							
Timely initiation of breastfeeding (0-23 months)	82.5% (75.0-88.6)	85.0% (77.8-90.6)	92.4% (86.5-96.3)	82.6% (75.4-88.4)	84.5% (77.0-90.2)	90.6% (84.8-94.8)	
Exclusive breastfeeding under 6 months (0-5 months)	46.1% (19.2-74.8)	40.0% (19.1-63.9)	47.0% (22.9-72.1)	38.1% (18.1-61.5)	70.0% (34.7-93.3)	30.0% (6.6-65.2)	
Continued breastfeeding at 1 year (12-15 months)	80.7% (60.6-93.4)	92.8% (76.5-99.1)	83.3% (62.6-95.2)	90.6% (74.9-98.0)	86.3% (65.0-97.0)	96.7% (83.3-99.9)	
Continued breastfeeding at 2 years (20-23 months)	42.8% (21.8-65.9)	42.8% (21.8-65.9)	44.0% (24.4-65.0)	47.8% (26.8-69.4)	36.0% (17.9-57.4)	76.0% (54.8-90.6)	
Introduction of solid, semi-solid or soft foods (6-8months)	24.0% (9.3-45.1)	16.6% (4.7-37.3)	28.5% (11.2-52.1)	11.7% (3.3-27.4)	14.2% (4.0-32.6)	27.0% (13.7-44.1)	
Consumption of iron-rich or iron-fortified foods (6-23	77.6% (68.4-85.2)	55.9% (46.1-65.4)	85.4% (77.1-91.6)	83.3% (75.2-89.6)	76.3% (67.3-83.9)	78.5% (70.3-85.3)	
Bottle feeding (0-23 months)	1.6% (0.2-5.7)	3.1% (0.8-7.8)	3.2% (0.8-7.9)	3.5% (1.1-8.0)	4.0% (1.3-9.1)	7.4% (3.7-12.9)	
WOMEN 15-49 years							
Anaemia (non-pregnant) (UNHCR SENS cut off)							
Total Anaemia (Hb <12.0 g/dl)	21.8% (14.5-30.7)	27.1% (18.5-37.1)	27.8% (20.1-36.7)	17.4% (11.7-24.5)	33.7% (26.7-41.3)	40.8% (32.1-49.9)	**High if ≥ 40%**

Camps	% (95% CI)						Classification of public health significance / target (where applicable)
	Khor Alwaral	Um Sangour	Al Radis 1&2	El Kashafa	Jouri	Alagaya & Dabat Bosin	
Mild (Hb 11.0-11.9)	11.8% (6.4-19.3)	15.6% (9.0-24.4)	20.5% (13.7-28.7)	8.1% (4.2-13.6)	21.5% (15.6-28.4)	26.4% (18.9-35.0)	
Moderate (Hb 8.0-10.9)	7.3% (3.1-13.8)	11.5% (5.8-19.5)	7.3% (3.4-13.5)	8.7% (4.7-14.4)	11.1% (6.7-16.7)	13.6% (8.1-20.8)	
Severe (Hb<8.0)	2.7% (0.5-7.7)	0.0%	0.0%	0.6% (0.0-3.6)	1.1% (0.1-4.1)	0.8% (0.0-4.3)	
Program coverage							
Pregnant women currently enrolled in the ANC	55.0% (31.5-76.9)	25.0% (7.2-52.3)	90.0% (55.5-99.7)	70.5% (44.0-89.6)	78.5% (49.2-95.3)	86.6% (59.5-98.3)	
Pregnant women currently receiving Iron-folic acid pills	50.0% (27.2-72.8)	25.0% (7.2-52.3)	90.0% (55.5-99.7)	70.5% (44.0-89.6)	69.2% (38.5-90.9)	73.3% (44.9-92.2)	
Food Security							
Proportion of households with a ration card	98.5% (94.5-99.8)	99.3% (95.9-99.9)	100.0%	100.0%	100.0%	98.8% (95.7-99.8)	
Proportion of households reporting that the food ration last the entire duration of the cycle (30 days)	74.3%	55.0%	77.3%	75.0%	87.6%	73.3%	
Proportion of households reporting using the following coping strategies over the past month:							
Borrowed cash, food or other items	50.0% (41.1-58.8)	54.4% (45.6-62.9)	57.6% (49.3-65.6)	48.7% (40.4-56.9)	48.5% (40.7-56.3)	50.3% (42.4-58.1)	
Sold any assets (furniture, seed stocks, tools, other NFI, livestock etc.)	8.5% (4.3-14.6)	11.0% (6.3-17.5)	16.5% (11.0-23.4)	15.3% (9.9-22.1)	14.1% (9.2-20.2)	17.8% (12.3-24.5)	

Camps	% (95% CI)						Classification of public health significance / target (where applicable)
	Khor Alwaral	Um Sangour	Al Radis 1&2	El Kashafa	Jouri	Alagaya & Dabat Bosin	
Requested increase remittances or gifts as compared to normal	32.3% (24.3-41.0)	24.6% (17.6-32.8)	29.8% (22.6-37.7)	32.7% (25.2-40.7)	24.1% (17.9-31.2)	22.6% (16.5-29.7)	
Reduced the quantity and/or frequency of meals	46.9% (38.1-58.1)	52.9% (44.2-61.5)	45.0% (36.9-53.3)	38.3% (30.4-46.5)	37.6% (30.3-45.3)	36.3% (29.0-44.0)	
Begged	3.8% (1.2-8.7)	11.0% (6.3-17.5)	5.3% (2.3-10.1)	2.7% (0.7-6.6)	4.7% (2.0-9.0)	13.1% (8.3-19.1)	
Engaged in potentially risky or harmful activities (Cutting live trees, smuggling, etc.)	42.3% (33.7-51.2)	65.4% (56.8-73.3)	39.0% (31.2-47.3)	56.0% (47.6-64.0)	47.6% (39.9-55.4)	61.9% (54.1-69.2)	
Proportion of households reporting using none of the coping strategies over the past month	10.0% (5.4-16.4)	3.7% (1.2-8.3)	13.3% (8.2-19.7)	8.0% (4.2-13.5)	16.4% (11.2-22.9)	7.1% (3.7-12.1)	
Combined results for consumption of food commodities and micronutrient rich foods by households							
Proportion of households consuming either a plant or animal source of vitamin A	68.9% (61.2-75.7)	51.5% (42.7-60.1)	67.5% (59.4-74.9)	63.3% (55.0-71.0)	57.6% (49.8-65.1)	68.8% (61.2-75.7)	
Households consuming organ meat/flesh meat, or fish/seafood (HAEM FE)	81.4% (74.7-87.0)	38.2% (30.0-46.9)	88.0% (81.8-92.7)	78.0% (70.5-84.3)	78.8% (71.9-84.7)	81.4% (74.7-87.0)	

Camps	% (95% CI)						Classification of public health significance / target (where applicable)
	Khor Alwaral	Um Sangour	Al Radis 1&2	El Kashafa	Jouri	Alagaya & Dabat Bosin	
WASH (WATER QUANTITY , SAFE EXCRETA DISPOSAL)							
Proportion of households using an improved drinking water source	100.0%	100.0%	100.0%	100.0%	100.0%	100%	
Proportion of households that say they are satisfied with the drinking water supply	54.2% (45.2-62.9)	23.4% (16.5-31.3)	58.0% (49.6-66.0)	72.3% (64.3-79.3)	66.5% (58.8-73.5)	70.3% (62.7-77.1)	
≥20lpppd	48.5% (39.7-57.3)	32.8% (25.0-41.3)	58.9% (50.6-66.8)	58.8% (50.4-66.8)	69.4% (61.8-76.2)	16.9% (11.5-23.5)	
15- <20lpppd	22.7% (15.8-30.8)	16.1% (10.3-23.3)	23.8% (17.2-31.4)	25.0% (18.2-32.7)	16.5% (11.2-22.9)	59.4% (51.4-66.9)	
<15lpppd	28.8% (21.4-37.3)	51.1% (42.4-59.7)	17.2% (11.5-24.2)	16.2% (10.6-23.1)	14.1% (9.2-20.2)	23.6% (17.3-30.8)	
Average consumption: Liters per person per day (LPPPD)	18.9	16.0	21.7	21.8	23.6	21.4	**UNHCR target is ≥20 lpppd (post emergency standard)**
Proportion of households using an improved excreta disposal facility (improved toilet facility, not shared)	0.8% (0.0-4.1)	1.5% (0.1-5.2)	0.0%	0.0%	0.0%	0.0%	
Proportion of households using a shared family toilet	3.8% (1.2-8.6)	0.7% (0.0-4.0)	1.4% (0.1-4.8)	0.7% (0.0-3.9)	0.7% (0.0-3.6)	0.6% (0.0-3.5)	
A communal toilet (improved toilet facility, 3 households or	75.6% (67.3-82.6)	77.2% (69.2-83.9)	68.0% (59.8-75.4)	67.4% (58.9-75.1)	75.8% (68.2-82.3)	74.5% (66.9-81.1)	

Camps	% (95% CI)						Classification of public health significance / target (where applicable)
	Khor Alwaral	Um Sangour	Al Radis 1&2	El Kashafa	Jouri	Alagaya & Dabat Bosin	
An unimproved toilet (unimproved toilet facility or public toilet)	19.8% (13.3-27.70)	20.6% (14.1-28.3)	30.6% (23.2-38.7)	31.9% (24.2-40.3)	23.5% (17.0-31.0)	24.8% (18.3-32.3)	
Proportion of households with children under three years old that dispose of faeces safely	72.5% (62.1-81.3)	56.5% (45.2-67.2)	58.5% (47.8-68.5)	61.1% (50.2-71.2)	69.7% (59.6-78.5)	70.4% (60.8-78.7)	
Mosquito net coverage							
Proportion of households owning at least one mosquito net of any type	49.6% (40.6-58.5)	19.2% (13.0-26.6)	76.8% (69.2-83.2)	69.3% (61.2-76.5)	72.3% (64.9-78.7)	68.4% (60.8-75.3)	
Proportion of households owning at least one LLIN	44.9% (36.2-53.9)	15.6% (10.0-22.6)	75.5% (67.8-82.1)	69.3% (61.2-76.5)	72.3% (64.9-78.7)	68.4% (60.8-75.3)	Target of >80%
Proportion of total population (all ages) Slept under net of any type	28.9%	12.5%	64.7%	52.2%	56.9%	52.5%	
Mortality							
Crude Mortality Rate (CMR) (total deaths/10,000 people / day)	0.2 (0.1-0.7)	0.5 (0.2-1.5)	0.3 (0.1-0.9)	0.2 (0.1-0.6)	0.3 (0.1-1.8)	0.3 (0.1-1.2)	**Critical if >1/10,000/day**
Under five Mortality Rate (U5MR) (deaths in children under five/10,000 children under five / day)	0.5 (0.1-5.1)	1.1 (0.3-3.6)	0.6 (0.1-2.5)	0.5 (0.1-3.0)	1.0 (0.2-5.4)	0.7 (0.1-7.4)	**Critical if >2/10,000/day**

Interpretation of results

CLASSIFICATION OF PUBLIC HEALTH SIGNIFICANCE FOR CHILDREN UNDER 5 YEARS OF AGE

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

Source: WHO (1995) Physical Status: The Use and Interpretation of Anthropometry and WHO (2000). The Management of Nutrition in Major Emergencies

Classification of public health significance

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

Source: WHO (2000) The Management of Nutrition in Major Emergencies

The overall findings of nutritional status of refugees in Khor Alwaral, Um Sangour and Al Redis 1&2 camps was classified as being critical, with Global Acute Malnutrition (GAM) prevalence above the 15% of emergency threshold (WHO classification). The results were as follows: 19.4% (15.3-23.9 C.I) in Khor Alwaral, 16.1% (12.5-20.5 C.I) in Um Sangour, and 18.8% (14.9-23.4 C.I) in Al Radis 1&2 camps. Whereas, the nutrition status for refugees in El Kashafa, Jouri and Alagaya & Dabat Bosin camps were classified as being in the serious category (10-14% WHO classification). The results were as follows: 13.1% (9.9-17.1 C.I) in El Kashafa, 14.3% (11.0-18.4 C.I) in Jouri, and 13.6% (10.6-17.4 C.I) in Alagaya and Dabat Bosin.

The prevalence of Severe Acute Malnutrition (SAM) ranged between 1.2% and 6.1% across the camps. The highest SAM prevalence was reported in Khor Alwaral 6.1% (4.0-9.1 C.I) and Jouri 3.7% (2.2-6.3 C.I), while the lowest prevalence was reported in El Kashafa 1.2% (0.5-3.0 C.I). The UNHCR intended target for the prevalence of GAM among children 6-59 months of age is < 10% and the target for the prevalence of SAM is <2% in refugee settings.

The prevalence of stunting (height-for-age) in all camps was within acceptable range (<20%), ranging between 4.6% and 13.8%.

The prevalence of Anaemia among children 6-59 months of age was categorized as critical (critical if ≥ 40%) in the following refugee camps: Alagaya & Dabat Bosin 44.8% (39.9-49.7 C.I), Khor Alwaral 46.8% (41.9-51.7 C.I) and Jouri 42.7 (37.7-48.1 C.I). In El Kashafa and Al Radis, anaemia prevalence was within the medium range of public health classification i.e. 38.3% (33.3-43.7 C.I) and 38.4% (33.3-43.8 C.I) respectively. In Um Sangour, this was recorded at 23.0% (18.7-29.9 C.I). Anaemia prevalence among women of reproductive age (15-49 years) was highest in Alagaya & Dabat Bosin 40.8% (32.1-49.9 C.I), classified as being in the critical category. This was followed by Jouri 33.7% (26.7-41.3 C.I), Al Radis 28.1% (20.1-36.7 C.I) and Um Sangour 27.1% (18.5-37.1 C.I), classified in the medium category. El Kashafa registered a prevalence of 17.1 % (11.7-24.5 C.I), which is acceptable. UNHCR Strategy for Nutrition and Food Security targets <20% for the prevalence of Anaemia in children 6-59 months of age and in women 15-49 years of age.

Key indicators for Infant and Young Children Feeding practices (IYCF) revealed varied results across the camps. Timely initiation of breastfeeding among children 0-23 month of age ranged between 82.5% and 92.4%. Exclusive breastfeeding among children 0-5 month of age was low except in Jouri camp that registered 70.0% (34.7-93.3 C.I). In the other camps this ranged between 30.0% and 47.0%, whereby the lowest was recorded in Alagaya & Dabat Bosin 30.0% (6.6-65.2 C.I). The time of introduction of solid, semi-solid or soft foods for children 6-8 months old was poor in all locations ranging between 11.7% and 28.5% (see table 1 for details).

The rate of diarrhea among children 6-59 month of age in the last two weeks prior to nutrition survey was relatively high in three camps i.e. Jouri 21.8% (17.8-26.4 C.I), Um Sangour 23.8% (19.5-28.7) and Al Radius 1&2 24.7% (20.3-29.7 CI). This was however lower in other locations i.e. Khor Alwaral 12.7% (9.6-16.6 C.I), El Kashafa 12.5% (9.3-16.40 C.I) and Alagaya & Dabat Bosin 15.9% (12.6-19.8 C.I).

The programme coverage for health indicators (measles vaccination and vitamin A supplementation) for children (both by card and mother/care-giver confirmation) was relatively good. For measles vaccination, the lowest coverage was recorded at 86.2% (81.8-89.9 C.I) in Um Sangour and the highest coverage was recorded at 100.0% in El Kashafa. Likewise, for Vitamin A supplementation, the lowest coverage was at 74.9% (69.9-79.3 C.I) in Um Sangour and the highest was recorded at 100.0% in El Kashafa.

Enrolment coverage for acutely malnourished children in the nutrition programme (measured at a point in time), by MUAC alone and as well all criteria was reported to be far below the expected target (target >90%). Admission into the TSFP program ranged between 14.2% and 66.6%. The lowest was reported in Um Sangour 14.2% (1.7-42.8), while the highest was recorded in Alagaya & Dabat Bosin 66.6% (34.8-90.0). Enrolment coverage in the Therapeutic Feeding Program based on Oedema and MUAC only were lowest in Khor Alwaral 4.1% (48.9-87.3) and Um Sangour 20.0% (0.5-71.6). The highest was reported in El Kashafa 100.0%. See table 1 above for other details.

General food assistance which is provided on monthly-basis is the main source of household food security for the entire refugee community across the eight camps. However, distribution encountered missing food commodities. In March 2018, refugees received Sorghum, salt and Vegetable oil (37% of the monthly allocation to cover 11 days), whereas in February only Sorghum and salt were distributed. Dependency on using negative coping strategies was high in all the camps (83.6 – 96.3% of refugees are using one or more of the negative coping strategies). For instance, the number of people that were not using any of the potentially harmful coping strategies only ranged between 3.7% and 16.4%.

The proportion of households using an improved drinking water source reported in all the camps was 100%, however, the per capita water use/consumption was identified as a key gap. Across the camps proportion who are using >20lpppd (UNHCR target) ranged between 16.9 – 69.4%. Overall, those who used <15 littler per person per day ranged between 14.1% and 51.1%. The lowest percentage

was reported in Jouri 14.1% (9.2-20.2 C.I), while the highest was recorded in Um Sangour 51.1% (42.4-59.7 C.I). See table 1 above for details.

The coverage for family/family shared toilets was low in all camps. Communal latrines were widely used. Unsafe excreta disposal method is rather common (open defecation is common in almost all locations). As a result, use of unsafe excreta disposal ranged between 19.8% and 31.9%. The lowest was reported in Khor Alwaral 19.8% (13.3-27.70 C.I), while the highest was recorded in El Kashafa 31.9% (24.2-40.3 C.I) in El Kashafa. The exposure to diarrhoeal diseases is primarily associated with poor hygiene and sanitation practices in the community. Proportion of households with children under three years old that dispose of faeces safely ranged between 56.5% and 72.5%. The lowest was reported in Al Radis 1&2 56.5% (45.2-67.2 C.I), while the highest was recorded in Um Sangour 72.5% (62.1-81.3 C.I).

The proportion of households owning at least one mosquito net of any type ranged between 19.2% and 76.8%. This is below UNHCR's target >80%. The lowest was reported in Um Sangour 19.2% (13.0-26.6 C.I), while the highest was recorded in Al Radis 1&2 76.8% (69.2-83.2 C.I). Other camps performed as follows: Khor Alwaral 49.6% (40.6-58.5 C.I), Alagaya & Dabat Bosin 68.4% (60.875.3 C.I), El Kashafa 69.3% (61.2-76.5 C.I), and Jouri 72.3% (64.9-78.7 C.I). The proportion of households owning at least one LLIN was below the UNHCR's target >80%. The lowest was reported in Um Sangour 15.6% (10.0-22.6), while the highest was recorded in Al Radis 1&2 75.5% (67.8-82.1 C.I). These findings are in contradiction with operational realities as mass distribution of LLIN was recently conducted in all the camps and host communities in December 2017. The most plausible reason for this is the likelihood for refugees having sold these LLINs in order to take care of other essential needs.

The retrospective mortality rates for the last 90 days (three months) for crude mortality rate (CMR) and under five years old children mortality rate (U5MR) were within acceptable limits for an emergency context i.e. <1.0/10,000/day for CMR and <2.0/10,000/day for U5MR. CMR results ranged between 0.2 and 0.5/10,000/day, while U5MR ranged between 0.5 and 1.1/10,000/day. See table 1 above for details.

With reference to UNICEF's conceptual framework for causes of malnutrition, the survey results show gaps in the areas of refugees' food security, various services associated with nutrition interventions and the general caring practices of community. Fragile dietary intake in terms of quality and quantity coupled with disease prevalence (mainly diarrhea and acute respiratory infections) were reported as main causes for high malnutrition prevalence. The irregularities of the monthly food distribution, ongoing pipeline breakage for pulses and cooking oil, limited options of household income to access the missing commodities from local market and very weak coping strategies remains a key challenge.

The relative weak programme implementation, dependency on single tool for admission criteria (using only MUAC as admission criteria for SAM and MAM cases) into the ongoing nutrition program,

loose referral linkages within the program (TSFP–OTP-SFP) and Blanket Supplementary programme, weak outreach interventions, nutritional and food resource sharing/dilutions at household level were among the observed gaps/issues of concern.   The survey findings call for an immediate and longer term solution to break the cycle of malnutrition in the refugee camps.

Summary of Key Recommendations and Priorities

Revisit the ongoing nutrition admission procedures (routine/active case finding and periodic MUAC screening) for the timely detection of malnutrition and maximize admission rate. (UNICEF, WFP and Nutrition partners).

Apply mixed admission criteria (MUAC and Weight-For-Height/WFH), check children at risk group (MUAC >12.5 cm and <13.5 cm) by WFH for secondary level screening to maximize opportunity to identify malnourished children during screening. (Nutrition partners/SRCS, MOH, MSF, GHF)

WFP should consider separating blanket supplementary feeding program (BSFP) from the monthly food ration distribution and link this with the nutrition program. The BSFP program should be used as an opportunity for timely detection of malnutrition, nutrition/health education etc. (WFP and Nutrition partners).

Minimize fragmentation of nutrition program in the camps and look for comprehensive approach, WFP and UNICEF to discuss and integrate the TFP and SFP program to ensure effective resource utilization and increased program quality.

UNICEF, UNHCR and partners to consider conducting Knowledge, Attitude and Practices (KAP) survey to assess the current knowledge, attitude and practices of communities regarding Infant and Young Children Feeding practices, WASH and behavioural changes of community awareness promotion.

Revisit the ongoing general food assistance modalities and devise a mechanisms to compensate missing food commodity from the food basket, conduct feasibility study for the combined cash and an in-kind assistance arm to avoid irregularities of food assistance. (WFP, UNHCR and food security partners).

Look for alternative forms of assistance which leads towards food secured households. UNHCR, WFP and government counterparts to plan for detailed study on food security situation for refugees and apply target-based approach to minimize dependency on routine food assistance.

Maintain and strengthen the provision of comprehensive community based primary health care programme for refugee and host populations. (UNHCR, WHO, UNICEF, UNFPA, health and nutrition partners)

Develop a strategy for periodic de-worming (<5yrs age children and above/school age children) campaign for refugees and host population, at least two times in the year to curb the high morbidity caseload with intestinal worms. (UNHCR, WHO, MOH and health partners).

Establish what happened to the LLINs that were distributed in all camps during the mass distribution campaign in 2017, as LLIN coverage is currently lower than UNHCR's target >80%. Additionally, monitor proper usage of these LLINs. (UNHCR, WHO, MOH and health partners).

Establish a clear outreach strategy, context specific awareness promotion which includes a wider perspective (Health, Nutrition, WASH etc.) with a clear monitoring approach to ensure appropriate messages are delivered and reflected on behavioural changes. (Health and nutrition technical working group at National and state level).

1. Introduction

Descriptions of study area

White Nile state is located in the Southern part of Sudan, sharing an international border with South Sudan in the South, national borders with South and the North Kordofan States to the west, Al Gezira and the Sennar States to the East, and Khartoum State to the North. Rabak is the capital of the State with other important cities includes Kosti, Elduein, Gutaina, Tandaliti and El Jabalain. It consists of nine localities, with an approximate total area of 30,411 km2. The economy heavily relies on agricultural and livestock activities. Fishery is another livelihood means which covers a substantial amount of food source and income for populations residing across riverbanks. The rain-fed agriculture comprises crop mix sorghum as the major crop, which together with sesame and millet, form about 97% of the total area under this system. There are also other crops grown on a limited scale such as groundnut, watermelon and guar. Sesame is cultivated as main cash income, but it requires high inputs (such as pesticides) during cultivation and harvest season, therefore too costly for small farmers to grow. For this reason, sesame is grown mostly by the rich farmers in the large scale as mechanized farming[1]. Women often cultivate small home gardens with a variety of crops. During the agricultural season between October to December and March/April, male family members migrate to large-scale mechanized and irrigated farms in western parts of the state to work as agricultural labourers. The labour demand also absorbs Persons of Concern (POCs) settled in the White Nile State. Though POCs are settled in the potential agriculture area (rain-fed and irrigable) and close to the White Nile River, the benefit from these resources is limited. Land in refugee areas is owned by the community/private, and access to the land remained with individual agreements with the landowners.

Persons of Concern in White Nile State

The conflict in South Sudan coupled with food insecurity situation forced hundreds of thousands of civilians, and this outflow continues into neighbouring countries including Sudan. The majority of refugees originate from South Sudan's Upper Nile (83%), followed by Jonglei (9%), and Unity (8%). Refugees in small numbers also arrived from NBeG, WBeG, Eastern, Western, Central Equatorial, Warrap and the Lakes. As of the end of February 2018, over 418,914 South Sudanese refugees had arrived in Sudan since December 2013, out of which about 171,562 are hosted in White Nile State, living across eight refugee camps and within host communities. The camps were established through time since May 2014 and continue receiving new arrivals[2]. The two camps Alagaya and Dabat Bosin situated in the Eastern part of river White Nile, in El Jabalein locality and the others including Jouri, Kashafa, El Radius 1 & 2, Um Sangour and Khor Alwaral are situated in the western part of the river in El Salaam locality. The refugees are dominantly from Nuer and Shuluk ethnic background. Nuer are settled only in Alagaya and Um Sangour camps.

---

[1] FAO 2011, Food Security in the White Nile State, joint household food security assessment.

[2] UNHCR monthly statistical report as of February 2018

Table 2 : Population per camp (UNHCR ProGres as of February 2018)

Camp/site	Total Individuals	Total HH
JOURI	9,614	2,459
El KASHAFA	13,015	3,026
ALAGAYA	15,321	4,327
DABAT BOSIN	3,025	820
AL RADIS 1	11,401	2,914
AL RADIS 2	22,973	5,676
UM SANGOUR	16,911	5,278
KHOR ALWARAL	48,898	12,761
Total	**141,158**	**37,261**

Coordination

UNHCR in collaboration with the government counterpart Commission of Refugees (COR) supports a coordinated response to refugees in Sudan. UNHCR also co-leads the national inter-agency Refugee Consultation Forum (RCF). Under the RCF there are national-level sectoral Technical Advisory Groups (TAGs) which includes health and nutrition TAG and field-level Refugee Working Groups (RWGs), aimed at contributing to an effective coordination mechanism for the refugee response at all levels. UNHCR, WFP, UNICEF, UNFPA and WHO in collaboration with the government of Sudan and partners, international and local agencies, has been providing lifesaving assistance and continue working towards ensuring the continuation of assistance to address health and nutritional needs for refugees on arrival at reception centers, in the camps and mixed settlements.

Nutrition Situation

The Community Management of Acute Malnutrition (CMAM) programme is the main nutrition activity in the Camps. The programme is generally the extension of national nutrition strategy which implies interagency coordinated effort, through sector-led coordination under the auspices of the Ministry of Health and specialized UN agencies, UNICEF, WHO, WFP and UNHCR. Project implementing and operational partners are guided by the national protocol and supported by the mandated UN agencies. Accordingly, UNICEF is responsible for the mobilization of therapeutic resources and provide technical guidance for the treatment of severe acute malnutrition (SAM). WFP is responsible for the mobilization of supplementary food which covers treatment of Moderate Acute Malnutrition (MAM), emergency Blanket supplementary feeding programme for pregnant women, lactating mothers, children 6-59 months and new arrivals. Ministry of Health is responsible and the main channel to receive and mobilize nutrition resources from the center to facility levels. UNHCR is responsible for coordination and providing support to health and nutrition programme at reception centres and camps, and also avails funding to bridge gaps whenever partners are facing funding problems. The project in Jouri camp is implemented by MOH and supported by UNHCR. Operational

partner (MSF-S) supports the treatment of severe acute malnutrition with medical complications at facility based stabilization center (SC) in El Kashafa and Khor Alwaral. Therapeutic milk F75/F100 and ReSoMal for the SC is provided by UNICEF.

The nutrition program comprises of a curative component for the treatment of severely and moderately acute malnutrition and protection or nutritional support for children 6 to 59 months of age, pregnant women and lactating mothers for the six months after delivery. Though the technical capacity and adherence to the WHO 2006 guidelines varies among camps, all camps in principle believe that they are implementing CMAM to address nutritional needs of persons of concerns. Nutrition services and activities in the camps at the time of the surveys included: Targeted Supplementary Feeding Programme (TSFP) for the treatment of Moderately Acute Malnutrition (MAM) by using Ready-to-Use Supplementary food (Plumpy-sup). Therapeutic feeding programme (TFP) for the treatment of Severely Acute Malnutrition (SAM) is through the CMAM model by using Ready-to-Use Therapeutic food (Plumpy-nut). The Stabilization Center (SC) for the treatment of Severely Acute Malnutrition with medical complications using therapeutic milk and inpatient medical care.

Periodic mass MUAC screening of children 6-59 months is undertaken every month with the admission cut off point of <12.5 cm. During the time of survey some of the camps ceased this programme due to budget constraints for the payment of outreach workers.

According to the above two figures there are significant differences between children screened on monthly-basis and total children in the nutrition program. For example, in January 61 children were screened as malnourished under SAM category, whereas 148 children were reported as new admission in the OTP and SC program. Though, admission into nutrition program is channelled from different sources (self-referral, health center referral, within program cross referral), the gap between the two indicators is wider and might be linked with data management and reporting.

Partner NGOs, MSF-Spain, SRCS, GHF and Ministry of Health are the main partners implementing nutrition and health programme in White Nile camps. In terms of operations, periodic and regular MUAC screening are undertaken by volunteers and outreach workers for the admission of malnourished children into the programme. Weight-for- height criteria is less utilised at community and facility level.
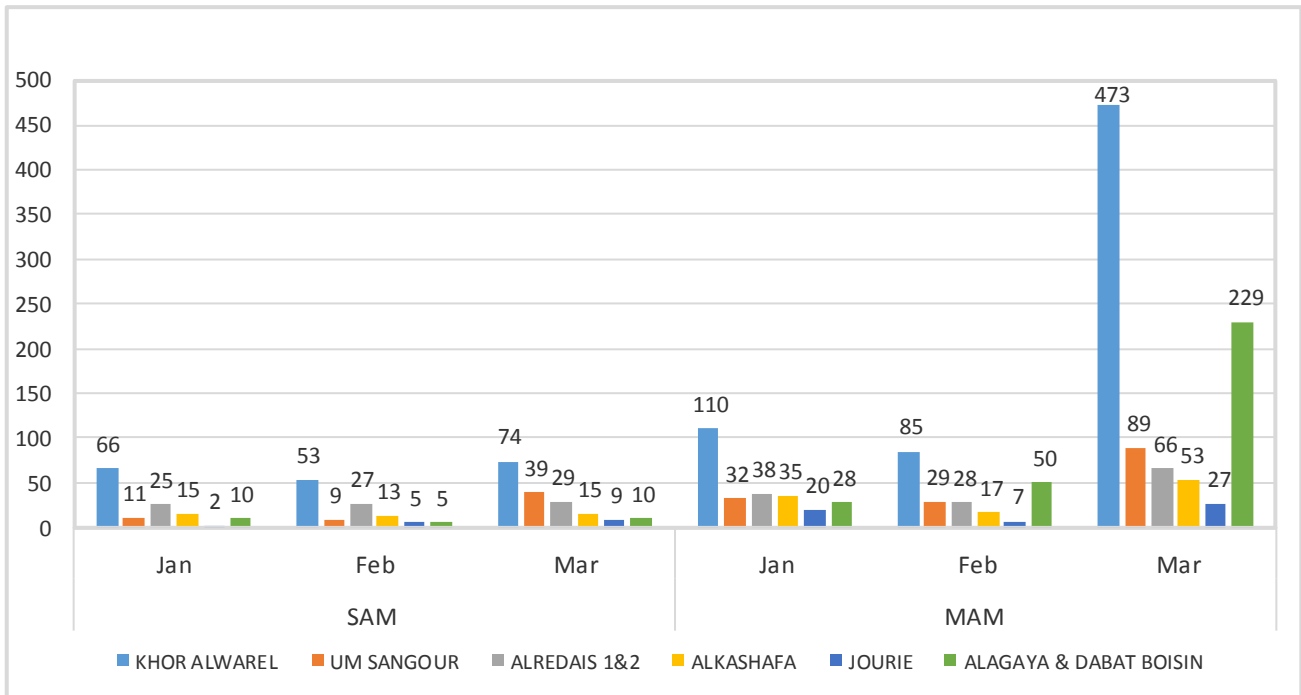
White Nile refugee camps were selected for the piloting of IYCF-framework, accordingly UNHCR supported MOH budget for the recruitment of IYCF focal personnel and operational costs. UNICEF also supports elements of IYCF. The IYCF aspects of nutrition programme is limited to awareness activities and it is difficult to measure the progress or impact in a precise manner.

Food Security

Refugees in the White Nile camps are dependent on the general food ration which is provided by WFP on monthly-basis. Access to additional sources of food/income is limited. WFP provides monthly food assistance through a Field Level Agreement (FLA) with SRSC. At the time of the survey, the planned General Food Distribution (GFD) comprised of cereals, pulses, vegetable oil, and salt with the assumption of meeting the energy requirements 2,081 kcal per person per day (see Table 3 below). However, pipeline break was encountered since the beginning of the year, pulses and oil were missing from the food basket, and the total amount which was distributed was estimated at about 1,600 Kilocalories per person per day.

Table 3: Contents of the current general food ration – White Nile refugee camps

RATION CONTENTS	Daily Ration	Energy	Protein	Fat	Calcium	Copper	Iodine	Iron	Magnesium	Selenium	Zinc
	g/person/day	kcal	g	g	mg	mg	µg	Mg	mg	µg	mg
SORGHUM, GRAIN	475	1,610	53.7	15.7	133	5.1	-	20.9	903	58.0	7.3
LENTILS	60	206	15.5	0.6	34	0.3	-	4.5	73	5.0	2.9
OIL, VEGETABLE [WFP]	30	265	0.0	30.0	0	-	-	0.0	-	-	-
SALT, IODISED [WFP]	5	0	0.0	0.0	-	-	200	-	-	-	0.0
Ration totals:	570	2,081	69	46	167	5.4	200	25.4	976	62.9	10.2
Beneficiary requirements for:		2,100	52.5	40.0	989	1.1	138	32.0	201	27.6	12.4
	99%		132%	116%	17%	495%	145%	79%	485%	228%	82%
			13.3%	20.0%							

Recommended daily minimum kcal is 2,100 per person

Health situation

Primary healthcare services are provided in health facilities which are either run by the SMoH or NGOs in respective camps. El Kashafa and Khor Alwaral camps health facilities are run by MSF-Spain. Services are provided include primary healthcare and elements of secondary level care. This facility also has a stabilisation Center (SC) for the treatment of severely malnourished children with medical complications. Um Sangour, Al Radis 1 & 2 healthcare facilities are managed by SRCS. Alagaya, Dabat Bosin and Jouri healthcare facilities are supported by the SMoH. The referral system for secondary healthcare linked to General Hospitals in Jabalein and Kosti. Health promotion is an integral part of primary healthcare which is supported through community volunteers/ incentive workers. With exception of MSF-supported facilities the rest of healthcare system primarily supported by UNHCR, WHO, UNICEF and UNFPA.

In a descending order, the main causes of morbidity/illness in all camps is as follows: malaria, respiratory tract infections, diarrhoea, intestinal worms, and skin diseases. The disease prevalence varies with seasonal trends e.g. during the rainy/cold season the commonest morbidities are respiratory tract infections, malaria and diarrhoea. There are no seasonal variations among intestinal worms and skin diseases, which mainly affect children throughout the year.

Water and sanitation situation

White Nile camps are situated adjacent to River White Nile, and the water supply in all camps is connected to the river. Water is regularly collected from the river, treated and pumped to distribution points which are fixed in the appropriate locations, and easily accessed by the community. The quality of water is good, however, interruption of water supply is encountered in some of the locations due to pumping problems, which affects distribution of the amount per person per day < 15 Litres (Sphere Minimum Standard).

Although hygiene promotion varies between the camps, all locations have family shared latrines close to their shelters. However, the presence of open defecation in the surroundings of the camps is

indicative of the inadequate number of latrines to meet the needs. Additionally, the designs might not be culturally suitable to the context. Inadequate of knowledge on the utilization of latrines is also a possibility.

2. Survey Objectives

The survey was aimed at assessing the general health, nutrition and mortality indices of refugees in order to formulate action-oriented recommendations for appropriate nutrition, public health and related interventions.

Specific Objectives:

Primary objectives:
   a. To determine the prevalence of acute malnutrition among children 6-59 months
   b. To determine the prevalence of stunting among children 6-59 months
   c. To assess the two-week period prevalence of diarrhoea among children 6-59 months
   d. To assess the prevalence of Anaemia among children 6-59 months and women of reproductive age (non-pregnant, 15-49 years)
   e. To determine the coverage of measles vaccination among children 9-59 months
   f. To determine the coverage of vitamin A supplementation in the last six months among children 6-59 months
   g. To investigate IYCF practices among children 0-23 months
   h. To assess the proportion of households that use an adequate quantity of water per person per day
   i. To determine the population's access to improved water, sanitation and hygiene facilities.
   j. To determine the coverage of ration cards and the duration the General Food Distribution (GFD) ration lasts for recipient households
   k. To determine the extent to which negative coping strategies are used by households
   l. To assess household dietary diversity
   m. To determine the utilization of mosquito nets (all types and LLINs) by the total population, children 0-59 months and pregnant women
   n. To make recommendations on actions to be undertaken to address the situation

Secondary objectives:
   o. To assess crude and under-five mortality rates in the refugee settlements in the last three months.
   p. To determine enrolment into Antenatal Care clinic and coverage of iron-folic acid supplementation in pregnant women.
   q. To assess the enrolment status of children 6-59 months into selective feeding programmes (OTP/SC and TSFP).

3. Methodology

The survey followed UNHCR's Standardized Expanded Nutrition Survey (SENS) guidelines for refugee populations.

3.1 Sampling procedures and sample size calculations

The total households in the camps are considered as the sampling frame. A Household is considered as sampling unit and the total number of households to be studied were calculated by using ENA simple random sampling method. The data range for the sampling frame was taken from the total number of households which were labelled during the time of the survey. Empty houses were excluded from sampling.

Systematic/Interval random sampling method was used to estimate a representative sample of households and children, based on the expected prevalence of global acute malnutrition. The prevalence of global acute malnutrition (GAM) was derived from the 2016 SENS survey and a higher prevalence value from the confidence interval was used in order to maximize the sample size. The estimated desired precision (±5), proportion of children below 5 years, and average household size with a 10% allowance for non-response was used. Finally, a correction was made for the smaller population size as per the ENA for SMART guideline. Population data was obtained from the UNHCR ProGres database (as of 31st February 2018), which has the demographic breakdown of the population through biometrics (secondary) level registration of all refugees in the camps. Table 4 contains a summary of the sample size calculation.

Table 4 : Sample size calculation

	Khor Alwaral	Um Sangour	Al Radis 1 & 2	El Kashafa	Jouri	Alagaya & Dabat Bosin
Estimated prevalence (%) (SENS 2016)	23.3	23.3	23.3	25.0	25.0	17.7
± Desired precision (%) (UNHCR SENS guidelines)	±5	±5	±5	±5	±5	±5
Average household size (ProGres)	3.8	3.2	4.0	4.3	3.9	3.8
<5 population (%)(ProGres)	21.2	25.7	18.5	17.3	17.9	23.0
Non response households (NRR) (%)	10	10	10	10	10	10
Total Population	48,898	16,911	34,374	13,015	9,614	18,346
Children to be included	267	257	262	252	243	211
Households to be included for Anthropometry and Health module (ENA for SMART) Including NRR	409	385	437	419	430	299

All eligible children aged 6-59 months from all selected households were included in the assessment of anthropometry, anaemia and health, while children aged 0-23 months were included for assessment infant and young child feeding practices. All selected households were assessed for

demographic data to estimate the mortality rate. Whereas half of the selected households were considered as representative and assessed for Food Security, WASH, Mosquito net coverage, and women (15-49 years) for HB level measurement (for anaemia determination) and coverage for antenatal care.

3.2 Questionnaire and measurement methods

Questionnaires

Questionnaires were prepared in English language and were administered in Arabic and local language (Nuer and Shuluk) via translators. Following the SENS guideline, the six modules of SENS were used (anthropometry and health, Anaemia, IYCF, WASH, mosquito net coverage, and food security). In addition, the mortality module was included to collect demographic data. Following these modules questionnaires were designed to provide information on the relevant indicators for the different target groups as indicated in the survey objectives. The six modules of questionnaires covered the following areas and measurements:

Module 1 (anthropometry and health): *Children 6-59 months-* This included information on questions and measurements on children aged 6-59 months. Information was collected on anthropometric status, Oedema, enrolment in selective feeding programmes, immunization (measles), vitamin A supplementation in the last six months, morbidity from diarrhoea in past two weeks.

Module 2 (Anaemia): Haemoglobin assessment among children aged 6 – 59 months and non-pregnant women*: Women 15-49 years-* This included questions and measurements on women aged 15 – 49 years. Information was collected on women's pregnancy status, enrolment in ANC, coverage of iron-folic acid pills.

Module 3 (IYCF): Children 0-23 months- This included questions on infant and young child feeding (IYCF) practices among children aged 0-23 months.

Module 4: *Water, Sanitation and Hygiene (WASH)* this included questions on the quantity of water used per household and the satisfaction with the drinking water supply, hygiene and sanitation.

Module 5: *Food Security: -* This included questions on access and use of the GFD ration, negative coping mechanisms and household dietary diversity.

Module 6: *Mosquito net:-*This included questions on proportion of households owning at least one mosquito net and utilization.

Additional Module from SMART: Mortality- This included questions related to mortality in the last three months among the households.

3.3 Measurement methods

a) Household-level indicators

WASH, Food Security and Mosquito Net: The questionnaire that was used under this section was adopted from the UNHCR's Standardized Expanded Nutrition Survey Guidelines for Refugee Populations.

Mortality: Individual-level mortality data collection was used from the SMART methodology.

b) Individual-level indicators

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

Birth date or age in months for children 0-59 months: the exact date of birth (day, month, and year) was recorded from birth certificates and checked on an EPI card or child health card. If no reliable proof of age was available, age was estimated in months using multiple approaches, by using a local seasonal and events calendar or by probing, checking if sibling age is known and length/height measurement was used for inclusion; the child had to measure between 65 cm and 110 cm. The age in mortality data was recorded in years.

Age of women 15-49 years: unlike small children, the exact date of birth of women was difficult to explore. Reported age was recorded in years.

Weight of children 6-59 months: measurements were taken to the closest 100 grams using an electronic scale (SECA scale). All children were weighed without clothes. Female children were measured by female survey team inside the selected house, or keeping light clothes to address cultural sensitivity.

Height/Length of children 6-59 months: children's height or length was taken to the closest millimeter using a wooden height board (*Shorr Product*). Height/age was used to decide on whether a child should be measured lying down (length) or standing up (height). Children less than 87cm (< 2 years) were measured lying down, while those greater than or equal to 87cm were measured standing up.

Oedema in children 6-59 months: bilateral Oedema was assessed by applying gentle thumb pressure on top of both feet of the child for a period of three seconds (counting 1001 to 1003) and thereafter observing for the presence or absence of an indent.

MUAC of children 6-59 months: MUAC was measured at the mid-point of the left upper arm between the elbow and the shoulder and taken to the closest millimeter using a standard tape. MUAC was recorded in centimeters.

Child enrolment in selective feeding programme for children 6-59 months: Selective feeding programme enrolment status was assessed for the outpatient therapeutic programme and for the supplementary feeding programme. This was verified by presence of a card or showing the mother or care-giver the sample products (Plumpynut and Plumpy Sup) given in the different programmes.

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 care-giver to recall if no EPI card was available. For ease of data collection, results were recorded on all children but were only analyzed for children aged 9-59 months.

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.

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 deciliter by using the portable HemoCue Hb 301$^+$ Analyzers (HemoCue, Sweden). If severe Anaemia was detected, the child or the woman was referred to health facility for treatment immediately.

Diarrhoea in last two weeks in children 6-59 months: an episode of diarrhoea was defined as three loose stools or more in 24 hours. Caregivers were asked if their child had suffered from episodes of diarrhoea in the past two weeks.

ANC enrolment and iron/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 the UNHCR's Standardized Expanded Nutrition Survey Guidelines for Refugee Populations.

Referrals: Children aged 6-59 months were referred to health centre/post for treatment when MUAC was < 12.5 cm, when Oedema was present, or when haemoglobin was < 7.0 g/dL. Women of reproductive age were referred to the hospital for treatment when haemoglobin was < 8.0 g/dL.

3.4 Case definitions, inclusion criteria and calculations

Mortality: The Crude Mortality Rate (CMR) was expressed as the number of deaths per 10,000 persons per day. The formula below was applied:

Crude Death Rate (CMR) = 10,000/a*f/ (b+f/2-e/2+d/2-c/2)

Where:

a = Number of recall days

b = Number of current household residents

c = Number of people who joined household during recall period

d = Number of people who left household during recall period

e = Number of births during recall period

f = Number of deaths during recall period

Malnutrition in children 6-59 months: Acute malnutrition was defined using weight-for-height index values or the presence of Oedema and classified as show in the table below. Main results are reported after analysis using the WHO 2006 Growth Standards.

Table 5 : Definitions of acute malnutrition using weight-for-height and/or Oedema 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 malnutrition	<80% to ≥70%	< -2 z-scores and ≥ -3 z-scores	No
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-off points shown below. Main results are reported according to the WHO Growth Standards 2006.

Table 6 : 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 following cut-offs. Main results are reported according to the WHO Growth Standards 2006.

Table 7 : 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 were used to define proxy malnutrition according to the following cut-off points in children 6-59 months:

Table 8 : Low MUAC values cut-offs in children 6-59 months

Categories of acute malnutrition	Categories of low MUAC values
Global acute malnutrition	<12.5 cm
Moderate acute malnutrition	≥ 11.5 cm and <12.5 cm
Severe acute malnutrition	< 11.5 cm:

Child enrolment in selective feeding programme for children 6-59 months: Feeding programme enrolment is estimated during the nutrition survey using the direct method as follows (reference: Emergency Nutrition Assessment: Guidelines for field workers. Save the Children. 2004):

Coverage of SFP programme (%) =

100 x *No. of surveyed children with MAM according to SFP admission criteria who reported being registered in SFP*
No. of surveyed children with MAM according to SFP admission criteria

Coverage of TFP programme (%) =

100 x *No. of surveyed children with SAM according to OTP admission criteria who reported being registered in OTP*
No. of surveyed children with SAM according to OTP admission criteria

---

Infant and young child feeding practices in children 0-23 months

Infant and young child feeding practices were assessed as follows based on the UNHCR SENS IYCF module (Version 1.3 (March 2012).

Timely initiation of breastfeeding in children aged 0-23 months*:*

Proportion of children 0-23 months who were put to the breast within one hour of birth
Children 0-23 months who were put to the breast within one hour of birth
Children 0-23 months of age

Exclusive breastfeeding under 6 months*:*
Proportion of infants 0–5 months of age who are fed exclusively with breast milk: (including expressed breast milk or from a wet nurse, ORS, drops or syrups (vitamins, breastfeeding minerals, medicines)
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

Consumption of iron rich or iron fortified foods in children aged 6-23 months:
Proportion of children 6–23 months of age who receive an iron-rich or iron-fortified food that is specially designed for infants and young children, or that is fortified in the home.
Children 6–23 months of age who received an iron-rich food or a food that was specially designed for infants and young children and was fortified with iron, or a food that was
Fortified in the home with a product that included iron during the previous day
Children 6–23 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

Anaemia in children 6-59 months and women of reproductive age non pregnant (15-49 years):
Anaemia was classified according to the following cut-off points in children 6-59 months and non-pregnant women of reproductive age. Pregnant women were not included in this survey for the assessment of Anaemia as recommended by UNHCR {pregnant women are not to be included in routine nutrition surveys for the assessment of Anaemia due sample size issues, (usually a small number of pregnant women are found) as well as the difficulties in assessing gestational age in pregnant women)}.

Table 9 : Definition of Anaemia (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

Classification of public health problems and targets

Mortality: The following thresholds are used for mortality.

Table 10 : Mortality benchmarks for defining crisis situations (NICS, 2010)

Emergency threshold
CDR > 1/10,000 / day: 'very serious'
CDR > 2 /10,000 /day: 'out of control'
CDR > 5 /10,000 /day: 'major catastrophe'
(double for U5MR thresholds)

Anthropometric data: The target for the prevalence of global acute malnutrition (GAM) for children 6-59 months of age by camp, country and region should be < 10% and the target for the prevalence of severe acute malnutrition (SAM) should be <2%. The table below shows the classification of public health significance of the anthropometric results for children under-5 years of age according to WHO:

Table 11: Classification of public health significance for children under 5 years of age

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

Selective feeding programmes:

Table 12 : Performance indicators for selective feeding programmes *

Category	Recovery	Case fatality	Defaulter rate	Coverage		
				Rural areas	Urban areas	Camps
SFP	>75%	<3%	<15%	>50%	>70%	>90%
TFP	>75%	<10%	<15%	>50%	>70%	>90%

* UNHCR and WFP selective feeding guideline 2011 and SPHERE standards for performance

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

Vitamin A supplementation coverage: UNHCR performance indicator; target for vitamin A supplementation coverage for children aged 6-59 months by camp, country and region should be >90%.

Anaemia data*:* UNHCR Strategic Plan for Nutrition and Food Security (2008-2010) states that the targets for the prevalence of Anaemia in children 6-59 months of age and in women 15-49 years of age should be low i.e. <20%. The severity of the public health situation should be classified according to WHO criteria as shown in the following Table.

Table 13 : Classification of public health significance (WHO 2000)

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

WASH: Diarrhoea caused by poor water, sanitation and hygiene accounts for the annual deaths of over two million children under five years old. Diarrhoea also contributes to high infant and child morbidity and mortality by directly affecting children's nutritional status. Refugee populations are often more vulnerable to public health risks and reduced funding can mean that long term refugee camps often struggle to ensure the provision of essential services, such as water, sanitation and hygiene. Hygienic conditions and adequate access to safe water and sanitation services is a matter of ensuring human dignity and is recognized as a fundamental human right. The following standards (amongst others) apply to UNHCR WASH programmes:

Table 14: UNHCR WASH Programme Standards

UNHCR Standard	Indicator
Average quantity of water available per person/day	> or = 20 litres (post-emergency standard)
Latrine provision	≤20 people/latrine (post-emergency standard)

Mosquito Net: Malaria is related to Anaemia levels and acute malnutrition is often associated with increased mortality from malaria, especially among young children.

Table 15 : UNHCR Mosquito net coverage Standards

Indicator Name	Unit	Denominator	Classification of public health significance or target
Proportion of total households owning at least one LLIN	%	Total number of households	Target of >80%
Average number of persons per LLIN	Number	Sum of the number of LLINs in all households	2 persons per LLIN

3.5 Training, coordination and supervision

A total of six survey teams each consisting of six team members (anthropometry measurer, anthropometric assistant, interviewer, HB data collector, demography and team leader) were organized from SMOH, COR, HAC, GHF and *SRCS*. The team members were 36 in number and were experienced in conducting surveys and the majority of these previously participated in the 2016 SENS survey and had health/nutrition background by training and profession. The teams were trained for five days in Kosti, followed by an additional day for field exercise for standardization and pilot testing. The training topics covered the following: purpose and objectives of the survey, roles and responsibilities of each team member, familiarization with the SENS questionnaires by reviewing the purpose of each question; interviewing skills, use of SMART phone and recording of data; interpretation of local/seasonal calendar of events and age determination; how to take anthropometric measurements and haemoglobin measurements and common errors usually made in the field, team work etc. The training included participatory approaches that covered a practical session for anthropometric measurement, HB measurement and role plays for household data collection. The practical session on anthropometric measurement involved volunteer children for practice. The practical session on haemoglobin measurement involved trainees measuring each other's Hb as well as undertaking a standardization test.

The survey was coordinated and supervised by experienced technical experts from UNHCR, WFP, UNICEF, WHO, MOH, HAC, COR and GHF. Each survey team was given explanation on the purpose of the survey and issues of confidentiality ensuring that verbal consent was obtained before proceeding with the survey in the selected households.

3.6 Data collection, entry and analysis

Each survey team was provided with a list of households to be surveyed on a daily basis, and was advised to follow the precautionary measures below:
- If an individual or an entire household was absent the teams were instructed to return to the household or revisit the absent individual up to two times on the same survey day. If they were unsuccessful after this, the individual or the household was recorded as an absence and they were not replaced with another household or individual.
- If the individual or an entire household refused to participate then it was considered as a refusal and the individual or the household were not replaced with another.
- If a selected child was disabled with a physical deformity preventing certain anthropometric measurements, the child was still included in the assessment of the other indicators
- If it was determined that a selected household did not have any eligible children, the relevant questionnaires were administered to the household.
- *If a selected child was found to be admitted in the nutrition or health center the team visited the center to take the measurements and the child's information. If it was impossible to visit the center, the child was given an ID number and considered as absent and not replaced. A note was made that the child was in a nutrition/health center at the time of the survey.

*This recommendation differs from the standard SMART recommendation which considers nutrition surveys that are usually conducted in large geographic areas and where it is often not possible to go to the nutrition or health center for measurement of the admitted children.

Data collection was carried out over five days period in each location and data collection was administered using android Tablet. The data from the Tablet was synchronized with the server daily. After this the various records were downloaded from the server as (csv) files to serve as a back-up thus minimizing the risk of data loss from the server and check the data quality. All the (csv) data were converted into Excel and data for children 6-59 months was transferred to ENA for SMART software for data analysis while that of the other indicators was transferred and analyzed by Epi-Info software.

At the end of the data collection, a complete set of data was ready. All data files were cleaned before analysis. Duplicate entries and incomplete data were identified in Excel and excluded from analysis. Analysis was performed using ENA for SMART and Epi Info software. The SMART Plausibility Report was generated for each complete set of survey data in order to check the quality of the anthropometric data and a summary of the key quality criteria is shown in Appendix 1.

Nutritional indices were cleaned using flexible cleaning criteria from the observed mean (also known as SMART flags in the ENA for SMART software), rather than the reference mean (also known as WHO flags in the ENA for SMART software). This flexible cleaning approach is recommended in the UNHCR SENS Guidelines in accordance with SMART recommendations. For the weight-for-height index, a cleaning window of +/- 3 SD value contained in the SMART for ENA software was used (Version: July 9th , 2015).

Quality control

Quality was maintained by comprehensive training and an intensive support supervision approach during the data collection period. The ENA-SMART plausibility check for anthropometric measurement was generated on a daily-basis and feedback was provided to the teams. The use of pre-programmed Android Tablets for data collection was used. Quality of data was ensured through: crosschecking of filled questionnaires on daily basis and daily review of performance of the data collection teams in addressing any difficulties encountered. The measurement tools were calibrated every morning before the start of the data collections; HemoCue machines were checked on a daily-basis. Daily reminders were made on proper use of the micro-cuvettes, digital weight scale and height measuring board. Additionally, all survey tools were duly maintained.

3.7 Ethical consideration and consent of study population

During the protocol development relevant partners, MOH, UNICEF and WFP were consulted and their respective input/feedback was duly incorporated. Each step of the survey was shared with relevant partners in order to ensure active participation and also keeping them updated on the progress. The

camp management, from COR and HAC were also informed at all levels. Refugee working group forum and health and nutrition technical meetings were used as an opportunity to share information with respect to the survey. Prior to the actual field work, community leaders and community members were informed about the survey. Household labeling was also used as an opportunity to pass messages to all community members.

Main ethical considerations including keeping privacy, cultural sensitivities and any issues associated with rights and dignity of the study populations were considered and respected. Given the comprehensive nature of the survey and taking of peripheral blood, verbal consent was obtained from individuals or/and households before the interviews, anthropometric measurements and haemoglobin test. Children and women with serious health and nutrition problems (either sick or malnourished) were referred to the health center for further assessment and treatment.

4. Results per Location

4.1 Anthropometric results (based on WHO standards 2006):

4.1.1 Results from Khor Alwaral

The percentage of U5 and average household size were derived from ProGres data base. The population used in the survey were presented as shown in Table 4.1.1 below.

Table 4.1. 1 : Demographic Characteristics of the study population in Khor Alwaral 2018

Total households planned	409
Total households surveyed	392
Total population surveyed	1,958
Total U5 surveyed	362
Average household size	3.8
% of U5	21.2

Table 4.1. 2 : Distribution of age and sex of sample

AGE (mo)	Boys		Girls		Total		Ratio
	no.	%	no.	%	no.	%	Boy:girl
6-17	44	53.0	39	47.0	83	24.0	1.1
18-29	42	55.3	34	44.7	76	22.0	1.2
30-41	37	57.8	27	42.2	64	18.5	1.4
42-53	43	55.8	34	44.2	77	22.3	1.3
54-59	24	52.2	22	47.8	46	13.3	1.1
Total	190	54.9	156	45.1	346	100.0	1.2
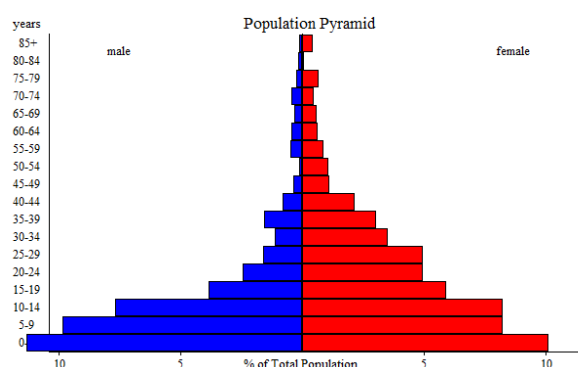
Figure 4. 1: Population age and sex pyramid

Table 4.1. 3: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or Oedema) and by sex

Indicator	All n = 346	Boys n = 190	Girls n = 156
	% (95% C.I.)		
Prevalence of global malnutrition (<-2 z-score and/or Oedema)	(67) 19.4 % (15.5 - 23.9)	(39) 20.5 % (15.4 - 26.8)	(28) 17.9 % (12.7 - 24.7)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no Oedema)	(46) 13.3 % (10.1 - 17.3)	(26) 13.7 % (9.5 - 19.3)	(20) 12.8 % (8.5 - 19.0)
Prevalence of severe malnutrition (<-3 z-score and/or Oedema)	(21) 6.1 % (4.0 - 9.1)	(13) 6.8 % (4.0 - 11.4)	(8) 5.1 % (2.6 - 9.8)

The prevalence of Oedema is 0.3 %

The overall weight-for-height Z-score (and/or Oedema) in Khor Alwaral shows a critical nutrition situation, with high prevalence of Global Acute Malnutrition (GAM) 19.4% (15.5-23.9 C.I) and SAM 6.1% (4.0-9.10 C.I), above the emergency threshold as per the WHO classification (GAM prevalence >15% and SAM >2%).
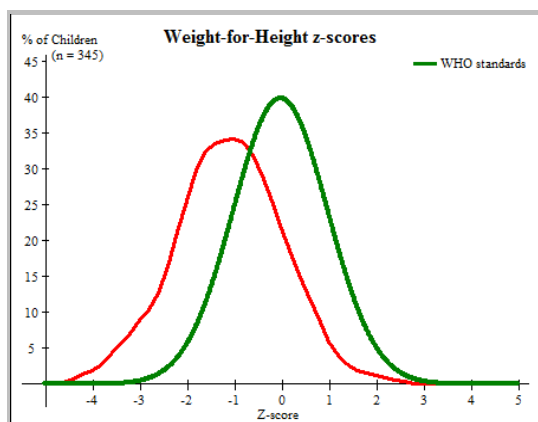
Figure 4. 2: Distribution of weight-for-height z-scores (based on WHO Growth Standards) in Khor Alwaral

The figure shows that the weight-for-height z-score distribution is shifted to the left, which indicates a poorer nutritional status in comparison to the international WHO Standard population of children aged 6-59 months.

Figure 4. 3: Trend in Prevalence of GAM and SAM in Children 6-59 months Khor Alwaral, Sudan: 2016 – 2018
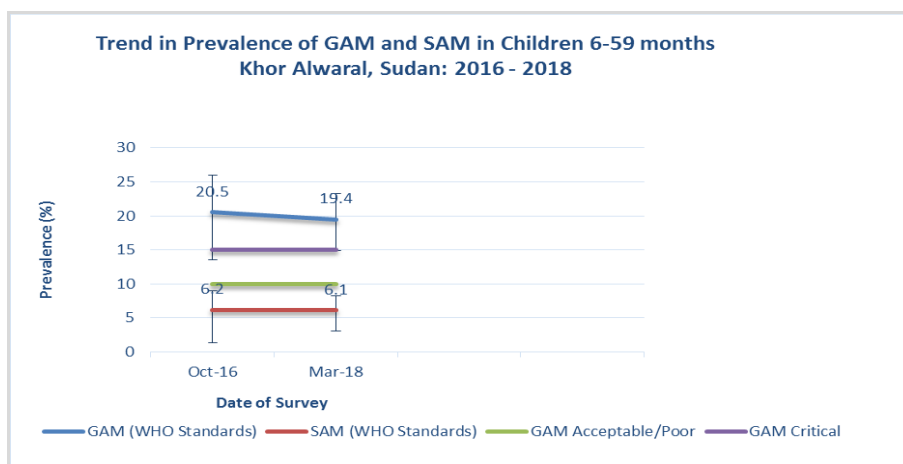
Trend analysis, with respect to comparison of SENS 2016 and 2018 results, the overall nutrition situation in the Khor Alwaral camp showed no significant improvement, as this has remained in the critical category. This could be attributed to the fact that this camp continues to receive new arrivals and also hosts a large number of refugee population. It is also worth noting that refugees coming from South Sudan suffer from food insecurity (IPC phase 4) and experience exhausting journeys. Additionally, there are inadequate social services in the camps, and the community outreach activities are relatively weak including active case finding component.

Table 4.1. 4 : Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or Oedema

Age (mo)	Total no.	Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
		No.	%	No.	%	No.	%	No.	%
6-17	83	8	9.6	12	14.5	62	74.7	1	1.2
18-29	76	2	2.6	10	13.2	64	84.2	0	0.0
30-41	64	3	4.7	6	9.4	55	85.9	0	0.0
42-53	77	4	5.2	12	15.6	61	79.2	0	0.0
54-59	46	3	6.5	6	13.0	37	80.4	0	0.0
Total	346	20	5.8	46	13.3	279	80.6	1	0.3

The prevalence of severe wasting is high in all children. Overall prevalence of severe wasting was 5.8%. The highest was recorded in 6-17 months age category (i.e 9.6 %) and the lowest was reported in the 18-29 months age group (i.e 2.6 %).

Table 4.1. 5: 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. 1 (0.3 %)
Oedema absent	Marasmic No. 20 (5.8 %)	Not severely malnourished No. 325 (93.9 %)

Table 4.1. 6: Prevalence of acute malnutrition based on MUAC cut off's (and/or Oedema) and by sex

Indictor	All n = 346	Boys n = 190	Girls n = 156
	% (95% C.I.)		
Prevalence of global malnutrition (< 125 mm and/or Oedema)	(23) 6.6 % (4.5 - 9.8)	(12) 6.3 % (3.6 - 10.7)	(11) 7.1 % (4.0 - 12.2)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no Oedema)	(17) 4.9 % (3.1 - 7.7)	(7) 3.7 % (1.8 - 7.4)	(10) 6.4 % (3.5 - 11.4)
Prevalence of severe malnutrition (< 115 mm and/or Oedema)	(6) 1.7 % (0.8 - 3.7)	(5) 2.6 % (1.1 - 6.0)	(1) 0.6 % (0.1 - 3.5)

Table 4.1. 7: Prevalence of acute malnutrition by age, based on MUAC cut off's and/or Oedema

Age (mo)	Total no.	Severe wasting (< 115 mm)		Moderate wasting (>= 115 mm and < 125 mm)		Normal (> = 125 mm)		Oedema	
		No.	%	No.	%	No.	%	No.	%
6-17	83	3	3.6	12	14.5	68	81.9	1	1.2
18-29	76	1	1.3	4	5.3	71	93.4	0	0.0
30-41	64	0	0.0	0	0.0	64	100.0	0	0.0
42-53	77	1	1.3	1	1.3	75	97.4	0	0.0
54-59	46	0	0.0	0	0.0	46	100.0	0	0.0
Total	346	5	1.4	17	4.9	324	93.6	1	0.3

Table 4.1. 8 : Prevalence of underweight based on weight-for-age z-scores by sex

Indictor	All n = 345	Boys n = 189	Girls n = 156
	% (95% C.I.)		
Prevalence of underweight (<-2 z-score)	(66) 19.1 % (15.3 - 23.6)	(45) 23.8 % (18.3 - 30.4)	(21) 13.5 % (9.0 - 19.7)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(50) 14.5 % (11.2 - 18.6)	(35) 18.5 % (13.6 - 24.7)	(15) 9.6 % (5.9 - 15.3)
Prevalence of severe underweight (<-3 z-score)	(16) 4.6 % (2.9 - 7.4)	(10) 5.3 % (2.9 - 9.5)	(6) 3.8 % (1.8 - 8.1)

Table 4.1. 9 : Prevalence of underweight by age category, based on weight-for-age z-scores

Age (mo)	Total no.	Severe underweight (<-3 z-score)		Moderate underweight (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
		No.	%	No.	%	No.	%	No.	%
6-17	82	6	7.3	11	13.4	65	79.3	1	1.2
18-29	76	3	3.9	12	15.8	61	80.3	0	0.0
30-41	64	3	4.7	11	17.2	50	78.1	0	0.0
42-53	77	4	5.2	11	14.3	62	80.5	0	0.0
54-59	46	0	0.0	5	10.9	41	89.1	0	0.0
Total	345	16	4.6	50	14.5	279	80.9	1	0.3

Table 4.1. 10: Prevalence of stunting based on height-for-age z-scores and by sex

Indictor	All n = 346	Boys n = 190	Girls n = 156
	% (95% C.I.)		
Prevalence of stunting (<-2 z-score)	(43) 12.4 % (9.4 - 16.3)	(29) 15.3 % (10.8 - 21.1)	(14) 9.0 % (5.4 - 14.5)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(32) 9.2 % (6.6 - 12.8)	(23) 12.1 % (8.2 - 17.5)	(9) 5.8 % (3.1 - 10.6)
Prevalence of severe stunting (<-3 z-score)	(11) 3.2 % (1.8 - 5.6)	(6) 3.2 % (1.5 - 6.7)	(5) 3.2 % (1.4 - 7.3)

Table 4.1. 11 : Prevalence of stunting by age based on height-for-age z-scores

Age (mo)	Total no.	Severe stunting (<-3 z-score)		Moderate stunting (>= -3 and <-2 z-score)		Normal (> = -2 z score)	
		No.	%	No.	%	No.	%
6-17	83	2	2.4	7	8.4	74	89.2
18-29	76	4	5.3	12	15.8	60	78.9
30-41	64	2	3.1	9	14.1	53	82.8
42-53	77	3	3.9	4	5.2	70	90.9
54-59	46	0	0.0	0	0.0	46	100.0
Total	346	11	3.2	32	9.2	303	87.6

Table 4.1. 12 : 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	345	-1.10±1.12	1.00	1	0
Weight-for-Age	345	-1.26±0.95	1.00	1	0
Height-for-Age	346	-0.90±1.01	1.00	0	0

* contains for WHZ and WAZ the children with edema.

3.1. Mortality results (retrospective over three months/90 days prior to interview)

Table 4.1. 13: Mortality rates

CMR (total deaths/10,000 people / day): 0.2 (0.1-0.7, 95% CI)
U5MR (deaths in children under five/10,000 children under five / day): 0.5 (0.1-5.1, 95% CI)

4.1.2 Results from Um Sangour

The percentage of U5 and average household size were derived from ProGres data base. The population used in the survey were presented as shown in Table 4.1.14 below.

Table 4.1. 14 : Demographic Characteristics of the study population in Um Sangour 2018

Total households planned	385
Total households surveyed	371
Total population surveyed	1,746
Total U5 surveyed	347
Average household size	3.2
% of U5	25.7

Table 4.1. 15 : Distribution of age and sex of sample

AGE	Boys		Girls		Total		Ratio
(mo)	no.	%	no.	%	no.	%	Boy:girl
6-17	38	46.9	43	53.1	81	25.1	0.9
18-29	32	43.8	41	56.2	73	22.6	0.8
30-41	27	48.2	29	51.8	56	17.3	0.9
42-53	36	52.9	32	47.1	68	21.1	1.1
54-59	30	66.7	15	33.3	45	13.9	2.0
Total	163	50.5	160	49.5	323	100.0	1.0
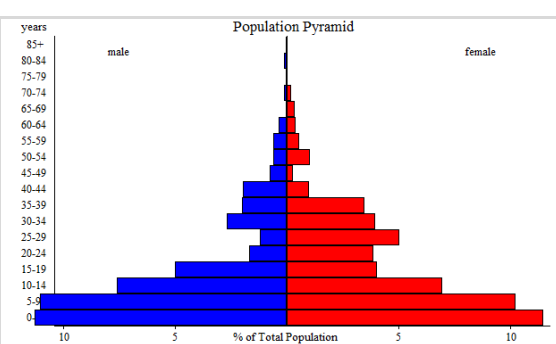
Figure 4. 4: Population age and sex pyramid

Table 4.1. 16: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

Indictor	All n = 323	Boys n = 163	Girls n = 160
	% (95% C.I.)		
Prevalence of global malnutrition (<-2 z-score and/or Oedema)	(52) 16.1 % (12.5 - 20.5)	(33) 20.2 % (14.8 - 27.1)	(19) 11.9 % (7.7 - 17.8)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no Oedema)	(46) 14.2 % (10.8 - 18.5)	(29) 17.8 % (12.7 - 24.4)	(17) 10.6 % (6.7 - 16.4)
Prevalence of severe malnutrition (<-3 z-score and/or Oedema)	(6) 1.9 % (0.9 - 4.0)	(4) 2.5 % (1.0 - 6.1)	(2) 1.3 % (0.3 - 4.4)

The prevalence of oedema is 0.0 %

The overall weight-for-height Z-score (and/or Oedema) in Um Sangour showed a critical nutrition situation, with high prevalence of Global Acute Malnutrition (GAM) 16.1% (12.5-20.5 C.I) and SAM 1.9% (0.9-4.0 C.I) slightly below the emergency threshold as per the WHO classification (GAM prevalence >15% and SAM >2%). The prevalence of acute malnutrition was higher amongst boys than in girls, and this might be related to child caring practices.
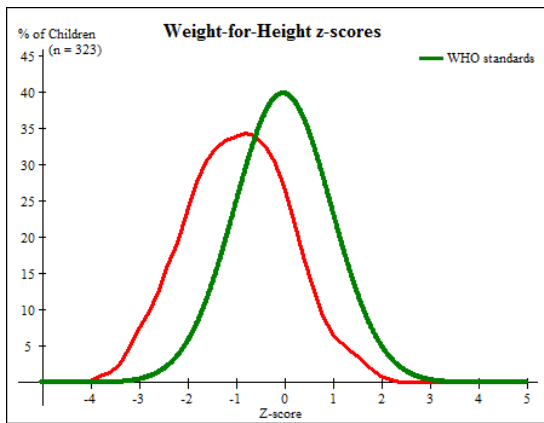
Figure 4. 5: Distribution of weight-for-height z-scores (based on WHO Growth Standards) in Um Sangour

The figure shows that the weight-for-height z-score distribution is shifted to the left, which indicates a poorer nutritional status in comparison to the international WHO Standard population of children aged 6-59 months.

Figure 4. 6: Trend in Prevalence of GAM and SAM in Children 6-59 months Um Sangour, Sudan: 2016 – 2018
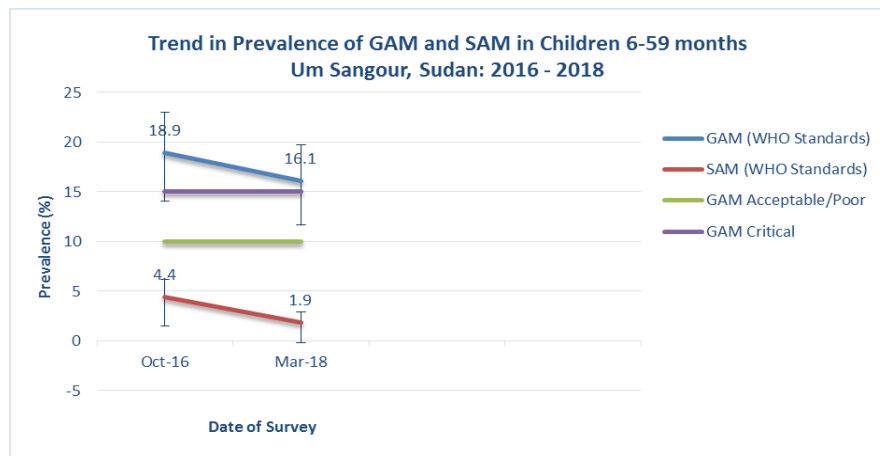
Trend analysis, with respect to comparison of SENS 2016 and 2018 results, the GAM and SAM rate in the Um Sangour camp shows some improvement. Although the GAM rate is critical, the SAM rate is within acceptable limits and this significantly dropped from 4.4 % in 2016 to 1.9% in 2018. The high GAM rate is associated with increased number of MAM children, which is ultimately associated with SFP program coverage.

Table 4.1. 17: Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema

Age (mo)	Total no.	Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
		No.	%	No.	%	No.	%	No.	%
6-17	81	4	4.9	18	22.2	59	72.8	0	0.0
18-29	73	0	0.0	8	11.0	65	89.0	0	0.0
30-41	56	0	0.0	6	10.7	50	89.3	0	0.0
42-53	68	2	2.9	7	10.3	59	86.8	0	0.0
54-59	45	0	0.0	7	15.6	38	84.4	0	0.0
Total	323	6	1.9	46	14.2	271	83.9	0	0.0

The prevalence of severe wasting was highest amongst children 6-17 months age category (i.e 4.9 %) and this was followed by the 42-53 months age group (i.e 2.9%). No cases of severe wasting were registered in other age categories.

Table 4.1. 18: 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. 6 (1.9 %)	Not severely malnourished No. 317 (98.1 %)

Table 4.1. 19: Prevalence of acute malnutrition based on MUAC cut off's (and/or oedema) and by sex

Indicator	**All** n = 323	**Boys** n = 163	**Girls** n = 160
	% (95% C.I.)		
Prevalence of global malnutrition (< 125 mm and/or Oedema)	(19) 5.9 % (3.8 - 9.0)	(4) 2.5 % (1.0 - 6.1)	(15) 9.4 % (5.8 - 14.9)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no Oedema)	(14) 4.3 % (2.6 - 7.1)	(4) 2.5 % (1.0 - 6.1)	(10) 6.3 % (3.4 - 11.1)
Prevalence of severe malnutrition (< 115 mm and/or Oedema)	(5) 1.5 % (0.7 - 3.6)	(0) 0.0 % (0.0 - 2.3)	(5) 3.1 % (1.3 - 7.1)

Table 4.1. 20: Prevalence of acute malnutrition by age, based on MUAC cut off's and/or oedema

Age (mo)	Total no.	Severe wasting (< 115 mm)		Moderate wasting (>= 115 mm and < 125 mm)		Normal (> = 125 mm)		Oedema	
		No.	%	No.	%	No.	%	No.	%
6-17	81	4	4.9	11	13.6	66	81.5	0	0.0
18-29	73	1	1.4	3	4.1	69	94.5	0	0.0
30-41	56	0	0.0	0	0.0	56	100.0	0	0.0
42-53	68	0	0.0	0	0.0	68	100.0	0	0.0
54-59	45	0	0.0	0	0.0	45	100.0	0	0.0
Total	323	5	1.5	14	4.3	304	94.1	0	0.0

Table 4.1. 21: Prevalence of underweight based on weight-for-age z-scores by sex

Indicator	**All** n = 323	**Boys** n = 163	**Girls** n = 160
	% (95% C.I.)		
Prevalence of underweight (<-2 z-score)	(43) 13.3 % (10.0 - 17.5)	(25) 15.3 % (10.6 - 21.7)	(18) 11.3 % (7.2 - 17.1)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(41) 12.7 % (9.5 - 16.8)	(23) 14.1 % (9.6 - 20.3)	(18) 11.3 % (7.2 - 17.1)
Prevalence of severe underweight (<-3 z-score)	(2) 0.6 % (0.2 - 2.2)	(2) 1.2 % (0.3 - 4.4)	(0) 0.0 % (0.0 - 2.3)

Table 4.1. 22: Prevalence of underweight by age category, based on weight-for-age z-scores

Age (mo)	Total no.	Severe underweight (<-3 z-score)		Moderate underweight (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
		No.	%	No.	%	No.	%	No.	%
6-17	81	2	2.5	14	17.3	65	80.2	0	0.0
18-29	73	0	0.0	8	11.0	65	89.0	0	0.0
30-41	56	0	0.0	6	10.7	50	89.3	0	0.0
42-53	68	0	0.0	8	11.8	60	88.2	0	0.0
54-59	45	0	0.0	5	11.1	40	88.9	0	0.0
Total	323	2	0.6	41	12.7	280	86.7	0	0.0

Table 4.1. 23: Prevalence of stunting based on height-for-age z-scores and by sex

Indicator	All n = 323	Boys n = 163	Girls n = 160
	% (95% C.I.)		
Prevalence of stunting (<-2 z-score)	(15) 4.6 % (2.8 - 7.5)	(9) 5.5 % (2.9 - 10.2)	(6) 3.8 % (1.7 - 7.9)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(13) 4.0 % (2.4 - 6.8)	(7) 4.3 % (2.1 - 8.6)	(6) 3.8 % (1.7 - 7.9)
Prevalence of severe stunting (<-3 z-score)	(2) 0.6 % (0.2 - 2.2)	(2) 1.2 % (0.3 - 4.4)	(0) 0.0 % (0.0 - 2.3)

Table 4.1. 24: Prevalence of stunting by age based on height-for-age z-scores

Age (mo)	Total no.	Severe stunting (<-3 z-score)		Moderate stunting (>= -3 and <-2 z-score)		Normal (> = -2 z score)	
		No.	%	No.	%	No.	%
6-17	81	1	1.2	6	7.4	74	91.4
18-29	73	0	0.0	4	5.5	69	94.5
30-41	56	1	1.8	0	0.0	55	98.2
42-53	68	0	0.0	2	2.9	66	97.1
54-59	45	0	0.0	1	2.2	44	97.8
Total	323	2	0.6	13	4.0	308	95.4

Table 4.1. 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	323	-0.94±1.04	1.00	0	0
Weight-for-Age	323	-1.01±0.89	1.00	0	0
Height-for-Age	323	-0.66±0.90	1.00	0	0

* contains for WHZ and WAZ the children with edema.

3.2 Mortality results (retrospective over three months/90 days prior to interview)

CMR (total deaths/10,000 people / day): 0.5 (0.2-1.5, 95% CI)
U5MR (deaths in children under five/10,000 children under five / day): 1.1 (0.3-3.6, 95% CI)

4.1.3 Results from Al Radis 1 & 2

The percentage of U5 and average household size were derived from ProGres data base. The population used in the survey were presented as shown in Table 4.1.26 below.

Table 4.1. 26: Demographic Characteristics of the study population in Al Radis 2018

Total households planned	437
Total households surveyed	409
Total population surveyed	1,769
Total U5 surveyed	347
Average household size	4.0
% of U5	18.5

Table 4.1. 27: Distribution of age and sex of sample

AGE (mo)	Boys		Girls		Total		Ratio
	no.	%	no.	%	no.	%	Boy:girl
6-17	45	60.8	29	39.2	74	22.8	1.6
18-29	32	41.6	45	58.4	77	23.7	0.7
30-41	32	57.1	24	42.9	56	17.2	1.3
42-53	43	54.4	36	45.6	79	24.3	1.2
54-59	19	48.7	20	51.3	39	12.0	0.9
Total	171	52.6	154	47.4	325	100.0	1.1
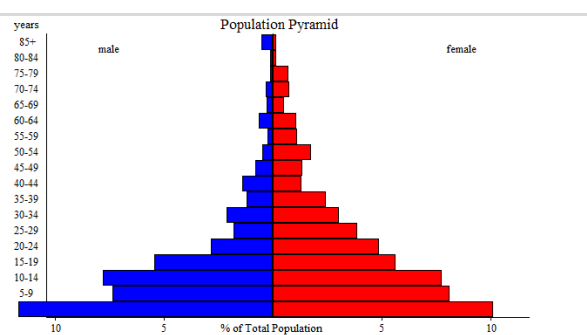
Figure 4. 7: Population age and sex pyramid

Table 4.1. 28: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

Indicator	All n = 325	Boys n = 171	Girls n = 154
	% (95% C.I.)		
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(61) 18.8 % (14.9 - 23.4)	(35) 20.5 % (15.1 - 27.1)	(26) 16.9 % (11.8 - 23.6)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(55) 16.9 % (13.2 - 21.4)	(29) 17.0 % (12.1 - 23.3)	(26) 16.9 % (11.8 - 23.6)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(6) 1.8 % (0.8 - 4.0)	(6) 3.5 % (1.6 - 7.4)	(0) 0.0 % (0.0 - 2.4)

The prevalence of oedema is 0.6 %

The overall weight-for-height Z-score (and/or Oedema) in Al Radis 1 & 2 showed a critical nutrition situation, with high prevalence of Global Acute Malnutrition (GAM) 18.8% (14.9-23.4 C.I) and SAM 1.8% (0.8-4.0 C.I) was slightly below the emergency threshold as per the WHO classification (GAM prevalence >15% and SAM >2%). The prevalence of acute malnutrition was higher amongst boys than girls, and this might be related to child caring practices.
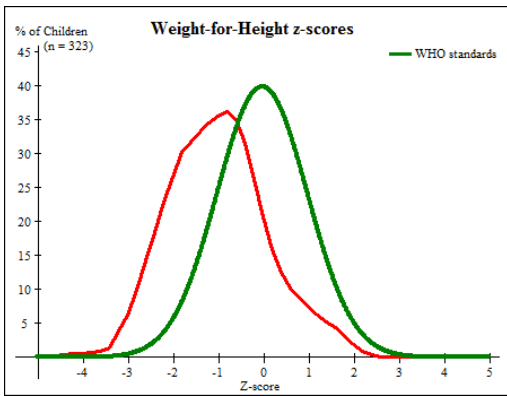
Figure 4. 8: Distribution of weight-for-height z-scores (based on WHO Growth Standards) in Alredias 1&2

The figure shows that the weight-for-height z-score distribution is shifted to the left, which indicates a poorer nutritional status in comparison to the international WHO Standard population of children aged 6-59 months.

Figure 4. 9:Trend in Prevalence of GAM and SAM in Children 6-59 months Al Radis 1&2, Sudan: 2016 - 2018
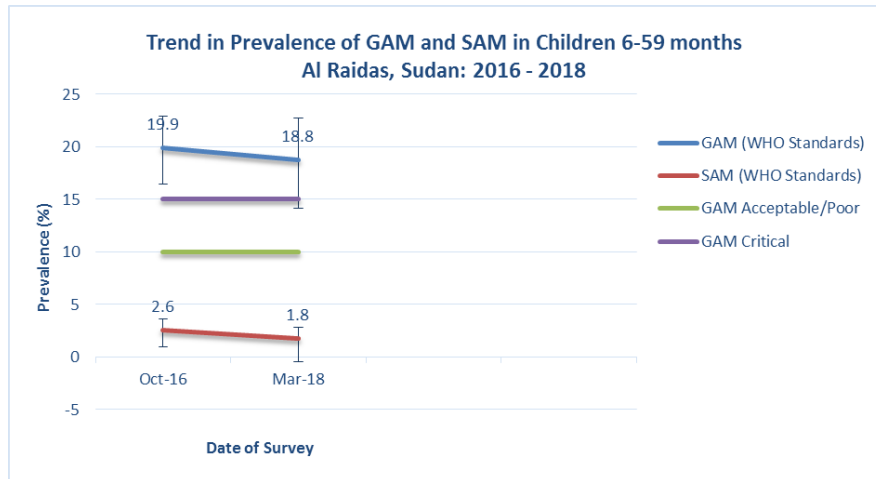
Trend analysis, comparisons of SENS 2016 and 2018 results, the GAM and SAM rate in the Al Radis camps shows improvement. Although the GAM rate is critical, the SAM rate is within acceptable limits and sinificantly dropped from 2.6 % in 2016 to 1.8% in 2018. The high GAM rate is associated with increased number of MAM children, which mostly associated with program coverages of SFP.

Table 4.1. 29: Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema

Age (mo)	Total no.	Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
		No.	%	No.	%	No.	%	No.	%
6-17	74	3	4.1	15	20.3	54	73.0	2	2.7
18-29	77	0	0.0	11	14.3	66	85.7	0	0.0
30-41	56	1	1.8	7	12.5	48	85.7	0	0.0
42-53	79	0	0.0	11	13.9	68	86.1	0	0.0
54-59	39	0	0.0	11	28.2	28	71.8	0	0.0
Total	325	4	1.2	55	16.9	264	81.2	2	0.6

The prevalence of severe wasting was highest amongst the children 6-17 months (i.e 4.1 %) and this was followed by the 30-41 months age group (i.e 1.8%).

Table 4.1. 30: 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. 2 (0.6 %)
Oedema absent	Marasmic No. 4 (1.2 %)	Not severely malnourished No. 319 (98.2 %)

Table 4.1. 31: Prevalence of acute malnutrition based on MUAC cut off's (and/or oedema) and by sex

Indicator	All n = 325	Boys n = 171	Girls n = 154
	% (95% C.I.)		
Prevalence of global malnutrition (< 125 mm and/or oedema)	(12) 3.7 % (2.1 - 6.3)	(7) 4.1 % (2.0 - 8.2)	(5) 3.2 % (1.4 - 7.4)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	(9) 2.8 % (1.5 - 5.2)	(5) 2.9 % (1.3 - 6.7)	(4) 2.6 % (1.0 - 6.5)
Prevalence of severe malnutrition (< 115 mm and/or oedema)	(3) 0.9 % (0.3 - 2.7)	(2) 1.2 % (0.3 - 4.2)	(1) 0.6 % (0.1 - 3.6)

Table 4.1. 32: Prevalence of acute malnutrition by age, based on MUAC cut off's and/or oedema

Age (mo)	Total no.	Severe wasting (< 115 mm)		Moderate wasting (>= 115 mm and < 125 mm)		Normal (> = 125 mm)		Oedema	
		No.	%	No.	%	No.	%	No.	%
6-17	74	0	0.0	8	10.8	66	89.2	2	2.7
18-29	77	0	0.0	1	1.3	76	98.7	0	0.0
30-41	56	1	1.8	0	0.0	55	98.2	0	0.0
42-53	79	0	0.0	0	0.0	79	100.0	0	0.0
54-59	39	0	0.0	0	0.0	39	100.0	0	0.0
Total	325	1	0.3	9	2.8	315	96.9	2	0.6

Table 4.1. 33: Prevalence of underweight based on weight-for-age z-scores by sex

Indicator	All n = 323	Boys n = 169	Girls n = 154
	% (95% C.I.)		
Prevalence of underweight (<-2 z-score)	(58) 18.0 % (14.2 - 22.5)	(36) 21.3 % (15.8 - 28.1)	(22) 14.3 % (9.6 - 20.7)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(49) 15.2 % (11.7 - 19.5)	(32) 18.9 % (13.7 - 25.5)	(17) 11.0 % (7.0 - 17.0)
Prevalence of severe underweight (<-3 z-score)	(9) 2.8 % (1.5 - 5.2)	(4) 2.4 % (0.9 - 5.9)	(5) 3.2 % (1.4 - 7.4)

Table 4.1. 34: Prevalence of underweight by age, based on weight-for-age z-scores

Age (mo)	Total no.	Severe underweight (<-3 z-score)		Moderate underweight (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
		No.	%	No.	%	No.	%	No.	%
6-17	72	2	2.8	13	18.1	57	79.2	2	2.8
18-29	77	4	5.2	8	10.4	65	84.4	0	0.0
30-41	56	2	3.6	17	30.4	37	66.1	0	0.0
42-53	79	1	1.3	9	11.4	69	87.3	0	0.0
54-59	39	0	0.0	2	5.1	37	94.9	0	0.0
Total	323	9	2.8	49	15.2	265	82.0	2	0.6

Table 4.1. 35: Prevalence of stunting based on height-for-age z-scores and by sex

Indicator	All n = 325	Boys n = 171	Girls n = 154
	% (95 % C.I.)		
Prevalence of stunting (<-2 z-score)	(45) 13.8 % (10.5 - 18.0 95% C.I.)	(26) 15.2 % (10.6 - 21.3 95% C.I.)	(19) 12.3 % (8.0 - 18.5 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(29) 8.9 % (6.3 - 12.5 95% C.I.)	(16) 9.4 % (5.8 - 14.7 95% C.I.)	(13) 8.4 % (5.0 - 13.9 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(16) 4.9 % (3.1 - 7.8 95% C.I.)	(10) 5.8 % (3.2 - 10.4 95% C.I.)	(6) 3.9 % (1.8 - 8.2 95% C.I.)

Table 4.1. 36: Prevalence of stunting by age based on height-for-age z-scores

Age (mo)	Total no.	Severe stunting (<-3 z-score)		Moderate stunting (>= -3 and <-2 z-score)		Normal (> = -2 z score)	
		No.	%	No.	%	No.	%
6-17	74	1	1.4	6	8.1	67	90.5
18-29	77	7	9.1	9	11.7	61	79.2
30-41	56	4	7.1	8	14.3	44	78.6
42-53	79	4	5.1	6	7.6	69	87.3
54-59	39	0	0.0	0	0.0	39	100.0
Total	325	16	4.9	29	8.9	280	86.2

Table 4.1. 37: 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	323	-0.99±1.07	1.00	2	0
Weight-for-Age	323	-1.17±0.90	1.00	2	0
Height-for-Age	325	-0.88±1.09	1.00	0	0

* contains for WHZ and WAZ the children with edema.

3.2 Mortality results (retrospective over 3 months/90 days prior to interview)

CMR (total deaths/10,000 people / day): 0.3 (0.1-0.9, 95% CI)
U5MR (deaths in children under five/10,000 children under five / day): 0.6(0.1-2.5, 95% CI)

4.1.4   Results from El Kashafa

The percentage of U5 and average household size were derived from ProGres data base. The population used in the survey were presented as shown in Table 4.1.38 below.

Table 4.1. 38:   Demographic Characteristics of the study population in El Kashafa 2018

Total households planned	419
Total households surveyed	382
Total population surveyed	1,869
Total U5 surveyed	357
Average household size	4.3
% of U5	17.3

Table 4.1. 39: Distribution of age and sex of sample

AGE (mo)	Boys		Girls		Total		Ratio
	no.	%	no.	%	no.	%	Boy:girl
6-17	44	49.4	45	50.6	89	26.5	1.0
18-29	34	50.0	34	50.0	68	20.2	1.0
30-41	36	50.0	36	50.0	72	21.4	1.0
42-53	40	51.9	37	48.1	77	22.9	1.1
54-59	15	50.0	15	50.0	30	8.9	1.0
Total	169	50.3	167	49.7	336	100.0	1.0
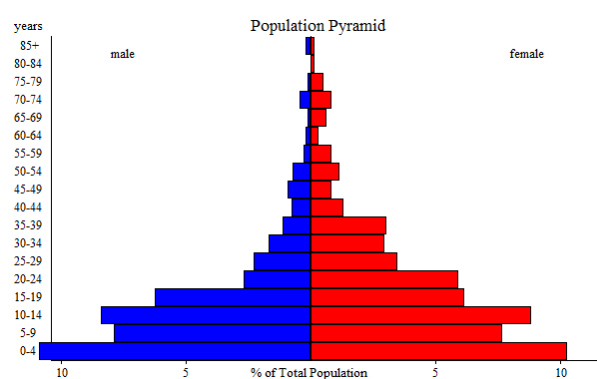
Figure 4. 10: Population age and sex pyramid

Table 4.1. 40: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or Oedema) and by sex

Indicator	All n = 336	Boys n = 169	Girls n = 167
	% (95% C.I.)		
Prevalence of global malnutrition (<-2 z-score and/or Oedema)	(44) 13.1 % (9.9 - 17.1)	(23) 13.6 % (9.2 - 19.6)	(21) 12.6 % (8.4 - 18.5)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no Oedema)	(40) 11.9 % (8.9 - 15.8)	(20) 11.8 % (7.8 - 17.6)	(20) 12.0 % (7.9 - 17.8)
Prevalence of severe malnutrition (<-3 z-score and/or Oedema)	(4) 1.2 % (0.5 - 3.0)	(3) 1.8 % (0.6 - 5.1)	(1) 0.6 % (0.1 - 3.3)

The prevalence of Oedema was 0.0 %

The overall weight-for-height Z-score (and/or Oedema) in El Kashafa camp showed improvement and lies within serious nutrition status category, with the prevalence of Global Acute Malnutrition (GAM) 13.1% (9.9-17.1 C.I) and SAM 1.2% (0.5-3.0 C.I), below the emergency threshold as per the WHO classification (GAM prevalence >15% and SAM >2%). The result did not show significant difference between boys and girls.
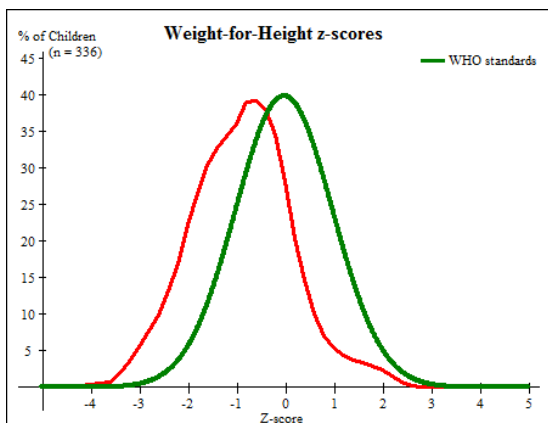
Figure 4. 11: Distribution of weight-for-height z-scores (based on WHO Growth Standards) in

The figure shows that the weight-for-height z-score distribution is shifted to the left, which indicates a poorer nutritional status in comparison to the international WHO Standard population of children aged 6-59 months.

Figure 4. 12:Trend in Prevalence of GAM and SAM in Children 6-59 months Kashafa, Sudan: 2016 - 2018
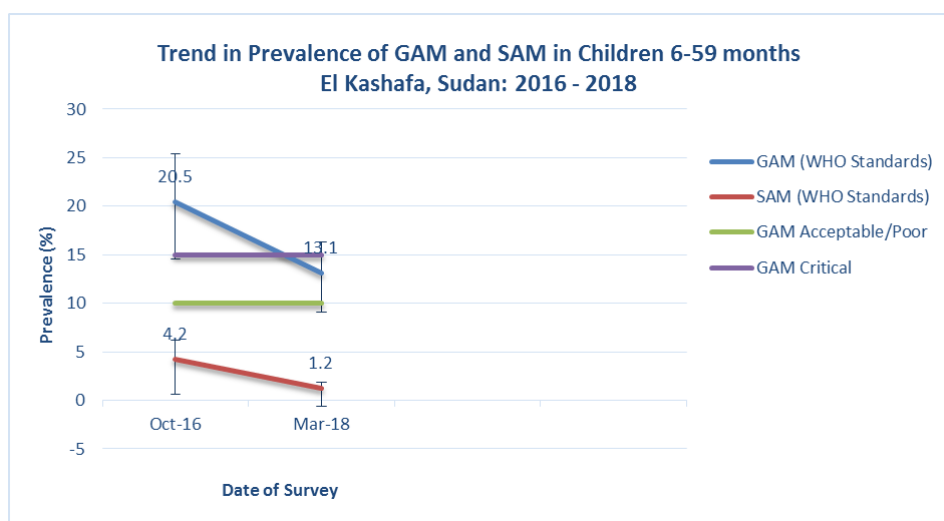
The trend analysis, with respect to comparison of SENS 2016 and 2018 results, the GAM and SAM rate in the El Kashafa camp showed improvement, with the GAM rate in the serious nutrition status category and the SAM rate was within acceptable limits. The GAM rate was 20.5% and SAM rate 4.2% in 2016, while the GAM rate was 13.1% and SAM rate was 1.2% in 2018.

Table 4.1. 41: Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or Oedema

Age (mo)	Total no.	Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
		No.	%	No.	%	No.	%	No.	%
6-17	89	3	3.4	16	18.0	70	78.7	0	0.0
18-29	68	0	0.0	4	5.9	64	94.1	0	0.0
30-41	72	1	1.4	6	8.3	65	90.3	0	0.0
42-53	77	0	0.0	10	13.0	67	87.0	0	0.0
54-59	30	0	0.0	4	13.3	26	86.7	0	0.0
Total	336	4	1.2	40	11.9	292	86.9	0	0.0

The prevalence of severe wasting was highest amongst children 6-17 months (i.e 3.4 %) and this was followed by the 30-41 months age group (i.e 1.4%).

51

Table 4.1. 42: 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. 4 (1.2 %)	Not severely malnourished No. 332 (98.8 %)

Table 4.1. 43: Prevalence of acute malnutrition based on MUAC cut off's (and/or Oedema) and by sex

Indicator	All n = 336	Boys n = 169	Girls n = 167
	% (95% C.I.)		
Prevalence of global malnutrition (< 125 mm and/or Oedema)	(9) 2.7 % (1.4 - 5.0)	(4) 2.4 % (0.9 - 5.9)	(5) 3.0 % (1.3 - 6.8)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no Oedema)	(8) 2.4 % (1.2 - 4.6)	(3) 1.8 % (0.6 - 5.1)	(5) 3.0 % (1.3 - 6.8)
Prevalence of severe malnutrition (< 115 mm and/or Oedema)	(1) 0.3 % (0.1 - 1.7)	(1) 0.6 % (0.1 - 3.3)	(0) 0.0 % (0.0 - 2.2)

Table 4.1. 44: Prevalence of acute malnutrition by age, based on MUAC cut off's and/or Oedema

Age (mo)	Total no.	Severe wasting (< 115 mm)		Moderate wasting (>= 115 mm and < 125 mm)		Normal (> = 125 mm)		Oedema	
		No.	%	No.	%	No.	%	No.	%
6-17	89	1	1.1	7	7.9	81	91.0	0	0.0
18-29	68	0	0.0	0	0.0	68	100.0	0	0.0
30-41	72	0	0.0	1	1.4	71	98.6	0	0.0
42-53	77	0	0.0	0	0.0	77	100.0	0	0.0
54-59	30	0	0.0	0	0.0	30	100.0	0	0.0
Total	336	1	0.3	8	2.4	327	97.3	0	0.0

Table 4.1. 45: Prevalence of underweight based on weight-for-age z-scores by sex

Indicator	All n = 336	Boys n = 169	Girls n = 167
	% (95% C.I.)		
Prevalence of underweight (<-2 z-score)	(39) 11.6 % (8.6 - 15.5)	(22) 13.0 % (8.8 - 18.9)	(17) 10.2 % (6.5 - 15.7)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(32) 9.5 % (6.8 - 13.1)	(19) 11.2 % (7.3 - 16.9)	(13) 7.8 % (4.6 - 12.9)
Prevalence of severe underweight (<-3 z-score)	(7) 2.1 % (1.0 - 4.2)	(3) 1.8 % (0.6 - 5.1)	(4) 2.4 % (0.9 - 6.0)

Table 4.1. 46: Prevalence of underweight by age, based on weight-for-age z-scores

Age (mo)	Total no.	Severe underweight (<-3 z-score)		Moderate underweight (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
		No.	%	No.	%	No.	%	No.	%
6-17	89	4	4.5	9	10.1	76	85.4	0	0.0
18-29	68	2	2.9	7	10.3	59	86.8	0	0.0
30-41	72	0	0.0	9	12.5	63	87.5	0	0.0
42-53	77	1	1.3	4	5.2	72	93.5	0	0.0
54-59	30	0	0.0	3	10.0	27	90.0	0	0.0
Total	336	7	2.1	32	9.5	297	88.4	0	0.0

Table 4.1. 47: Prevalence of stunting based on height-for-age z-scores and by sex

Indicator	All n = 336	Boys n = 169	Girls n = 167
	% (95% C.I.)		
Prevalence of stunting (<-2 z-score)	(30) 8.9 % (6.3 - 12.5)	(14) 8.3 % (5.0 - 13.4)	(16) 9.6 % (6.0 - 15.0)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(22) 6.5 % (4.4 - 9.7)	(11) 6.5 % (3.7 - 11.3)	(11) 6.6 % (3.7 - 11.4)
Prevalence of severe stunting (<-3 z-score)	(8) 2.4 % (1.2 - 4.6)	(3) 1.8 % (0.6 - 5.1)	(5) 3.0 % (1.3 - 6.8)

Table 4.1. 48: Prevalence of stunting by age based on height-for-age z-scores

Age (mo)	Total no.	Severe stunting (<-3 z-score)		Moderate stunting (>= -3 and <-2 z-score)		Normal (> = -2 z score)	
		No.	%	No.	%	No.	%
6-17	89	3	3.4	7	7.9	79	88.8
18-29	68	5	7.4	6	8.8	57	83.8
30-41	72	0	0.0	5	6.9	67	93.1
42-53	77	0	0.0	3	3.9	74	96.1
54-59	30	0	0.0	1	3.3	29	96.7
Total	336	8	2.4	22	6.5	306	91.1

Table 4.1. 49: 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	336	-0.88±1.02	1.00	0	0
Weight-for-Age	336	-1.02±0.87	1.00	0	0
Height-for-Age	336	-0.75±1.02	1.00	0	0

* contains for WHZ and WAZ the children with edema.

3.2 Mortality results (retrospective over three months/90 days prior to interview)

CMR (total deaths/10,000 people / day): 0.2 (0.1-0.6, 95% CI)
U5MR (deaths in children under five/10,000 children under five / day): 0.5 (0.1 3.0, 95% CI)

4.1.5 Results from Jouri

The percentage of U5 and average household size were derived from ProGres data base. The population used in the survey were presented as shown in Table 4.1.50 below.

Table 4.1. 50:   Demographic Characteristics of the study population in Jouri 2018

Total households planned	*430*
Total households surveyed	*410*
Total population surveyed	*2,154*
Total U5 surveyed	*360*
Average household size	*3.9*
% of U5	*17.9*

Table 4.1. 51: Distribution of age and sex of sample

AGE	Boys		Girls		Total		Ratio
(mo)	no.	%	no.	%	no.	%	Boy:girl
6-17	40	47.6	44	52.4	84	24.1	0.9
18-29	37	55.2	30	44.8	67	19.2	1.2
30-41	30	43.5	39	56.5	69	19.8	0.8
42-53	44	46.8	50	53.2	94	26.9	0.9
54-59	19	54.3	16	45.7	35	10.0	1.2
Total	170	48.7	179	51.3	349	100.0	0.9
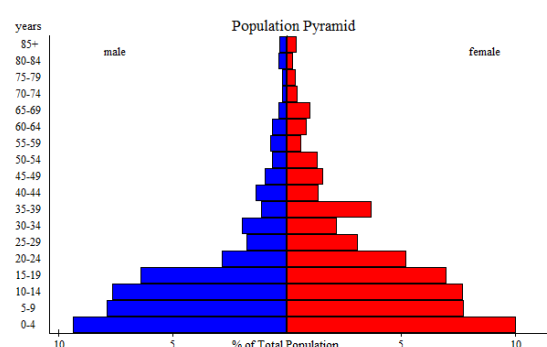
Figure 4. 13: Population age and sex pyramid

Table 4.1. 52: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or Oedema) and by sex

Indicator	All	Boys	Girls
	n = 349	n = 170	n = 179
	% (95% C.I.)		
Prevalence of global malnutrition (<-2 z-score and/or Oedema)	(50) 14.3 % (11.0 - 18.4)	(23) 13.5 % (9.2 - 19.5)	(27) 15.1 % (10.6 - 21.1)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no Oedema)	(37) 10.6 % (7.8 - 14.3)	(17) 10.0 % (6.3 - 15.4)	(20) 11.2 % (7.4 - 16.6)
Prevalence of severe malnutrition (<-3 z-score and/or Oedema)	(13) 3.7 % (2.2 - 6.3)	(6) 3.5 % (1.6 - 7.5)	(7) 3.9 % (1.9 - 7.9)

The prevalence of Oedema is 0.0 %

The overall weight-for-height Z-score (and/or Oedema) in Jouri showed varied results. The GAM rate was within serious nutrition situation category 14.3% (11.0-18.4), whereas the SAM rate was in the critical nutrition status category, with high prevalence rate of 3.7% (2.2-6.3). The GAM rate was slightly higher amongst girls than boys, however this was a statisically insignificant difference.

Table 4.1. 53: Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or Oedema

Age (mo)	Total no.	Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
		No.	%	No.	%	No.	%	No.	%
6-17	84	6	7.1	11	13.1	67	79.8	0	0.0
18-29	67	3	4.5	7	10.4	57	85.1	0	0.0
30-41	69	1	1.4	3	4.3	65	94.2	0	0.0
42-53	94	3	3.2	12	12.8	79	84.0	0	0.0
54-59	35	0	0.0	4	11.4	31	88.6	0	0.0
Total	349	13	3.7	37	10.6	299	85.7	0	0.0

The hihest prevalence of severe wasting was observed in the 6-17 months age category (i.e. 7.1%). This was followed by the 18-29 age category (i.e 4.5%) and 24-53 months age group (i.e 3.2%). No cases of severe wasting were registered in the 54-59 months age group.
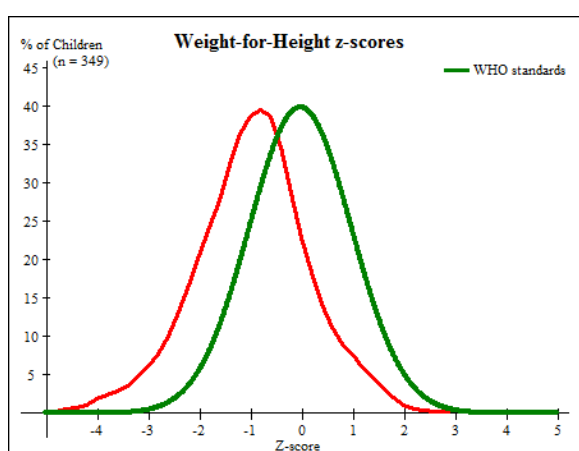
Figure 4. 14: Distribution of weight-for-height z-scores (based on WHO Growth Standards) in

The figure shows that the weight-for-height z-score distribution is shifted to the left, which indicates a poorer nutritional status in comparison to the international WHO Standard population of children aged 6-59 months.

Figure 4. 15:Trend in Prevalence of GAM and SAM in Children 6-59 months Jouri, Sudan: 2016 – 2018
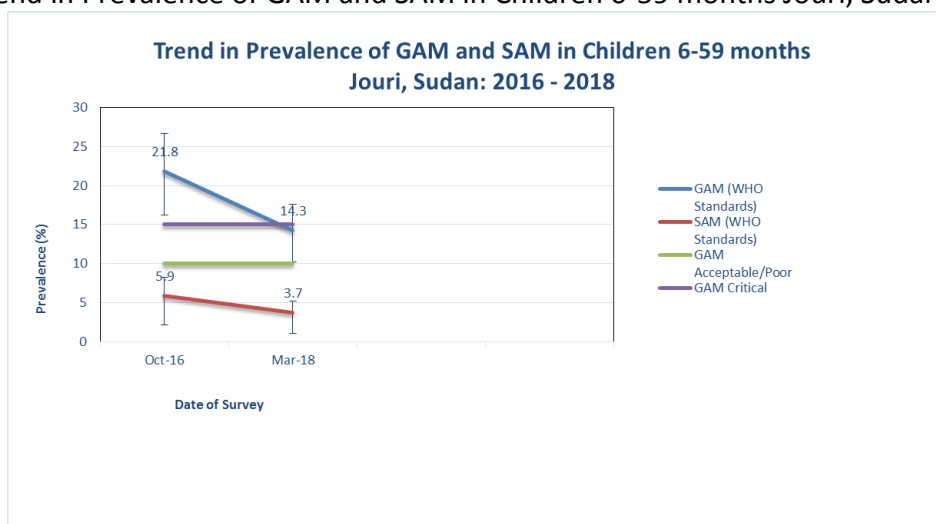
The trend analysis, with respect to comparison of SENS 2016 and 2018 showed improvement on overall GAM rate, although the SAM rate was in the critical nutrition status category. The GAM rate reduced from 21.8 % to 14.3% (2016 vs 2018) and the SAM rate reduced from 5.9 % to 3.7% (2016 vs 2018) respectively.

Table 4.1. 54: 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. 13 (3.7 %)	Not severely malnourished No. 336 (96.3 %)

Table 4.1. 55: Prevalence of acute malnutrition based on MUAC cut off's (and/or Oedema) and by sex

Indicator	All n = 349	Boys n = 170	Girls n = 179
	% (95% C.I.)		
Prevalence of global malnutrition (< 125 mm and/or Oedema)	(12) 3.4 % (2.0 - 5.9)	(2) 1.2 % (0.3 - 4.2)	(10) 5.6 % (3.1 - 10.0 95% C.I.)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no Oedema)	(10) 2.9 % (1.6 - 5.2)	(2) 1.2 % (0.3 - 4.2 95% C.I.)	(8) 4.5 % (2.3 - 8.6 95% C.I.)
Prevalence of severe malnutrition (< 115 mm and/or Oedema)	(2) 0.6 % (0.2 - 2.1)	(0) 0.0 % (0.0 - 2.2 95% C.I.)	(2) 1.1 % (0.3 - 4.0 95% C.I.)

Table 4.1. 56: Prevalence of acute malnutrition by age, based on MUAC cut off's and/or Oedema

Age (mo)	Total no.	Severe wasting (< 115 mm)		Moderate wasting (>= 115 mm and < 125 mm)		Normal (> = 125 mm)		Oedema	
		No.	%	No.	%	No.	%	No.	%
6-17	84	2	2.4	8	9.5	74	88.1	0	0.0
18-29	67	0	0.0	1	1.5	66	98.5	0	0.0
30-41	69	0	0.0	0	0.0	69	100.0	0	0.0
42-53	94	0	0.0	1	1.1	93	98.9	0	0.0
54-59	35	0	0.0	0	0.0	35	100.0	0	0.0
Total	349	2	0.6	10	2.9	337	96.6	0	0.0

Table 4.1. 57: Prevalence of underweight based on weight-for-age z-scores by sex

Indicator	All n = 349	Boys n = 170	Girls n = 179
	% (95% C.I.)		
Prevalence of underweight (<-2 z-score)	(60) 17.2 % (13.6 - 21.5)	(30) 17.6 % (12.7 - 24.1)	(30) 16.8 % (12.0 - 22.9)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(49) 14.0 % (10.8 - 18.1)	(23) 13.5 % (9.2 - 19.5)	(26) 14.5 % (10.1 - 20.4)
Prevalence of severe underweight (<-3 z-score)	(11) 3.2 % (1.8 - 5.6)	(7) 4.1 % (2.0 - 8.3)	(4) 2.2 % (0.9 - 5.6)

Table 4.1. 58: Prevalence of underweight by age, based on weight-for-age z-scores

Age (mo)	Total no.	Severe underweight (<-3 z-score)		Moderate underweight (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
		No.	%	No.	%	No.	%	No.	%
6-17	84	2	2.4	14	16.7	68	81.0	0	0.0
18-29	67	4	6.0	11	16.4	52	77.6	0	0.0
30-41	69	1	1.4	7	10.1	61	88.4	0	0.0
42-53	94	3	3.2	16	17.0	75	79.8	0	0.0
54-59	35	1	2.9	1	2.9	33	94.3	0	0.0
Total	349	11	3.2	49	14.0	289	82.8	0	0.0

Table 4.1. 59: Prevalence of stunting based on height-for-age z-scores and by sex

Indicator	All n = 349	Boys n = 170	Girls n = 179
	% (95% C.I.)		
Prevalence of stunting (<-2 z-score)	(43) 12.3 % (9.3 - 16.2)	(20) 11.8 % (7.7 - 17.5)	(23) 12.8 % (8.7 - 18.5)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(30) 8.6 % (6.1 - 12.0)	(13) 7.6 % (4.5 - 12.6)	(17) 9.5 % (6.0 - 14.7)
Prevalence of severe stunting (<-3 z-score)	(13) 3.7 % (2.2 - 6.3)	(7) 4.1 % (2.0 - 8.3)	(6) 3.4 % (1.5 - 7.1)

Table 4.1. 60: Prevalence of stunting by age based on height-for-age z-scores

Age (mo)	Total no.	Severe stunting (<-3 z-score)		Moderate stunting (>= -3 and <-2 z-score)		Normal (> = -2 z score)	
		No.	%	No.	%	No.	%
6-17	84	2	2.4	9	10.7	73	86.9
18-29	67	7	10.4	8	11.9	52	77.6
30-41	69	0	0.0	9	13.0	60	87.0
42-53	94	3	3.2	4	4.3	87	92.6
54-59	35	1	2.9	0	0.0	34	97.1
Total	349	13	3.7	30	8.6	306	87.7

Table 4.1. 61: 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	349	-0.92±1.15	1.00	0	0
Weight-for-Age	349	-1.05±1.07	1.00	0	0
Height-for-Age	349	-0.74±1.57	1.00	0	0

* contains for WHZ and WAZ the children with Oedema.

3.2 Mortality results (retrospective over x months/days prior to interview)

CMR (total deaths/10,000 people / day): 0.3 (0.1-1.8, 95% CI)
U5MR (deaths in children under five/10,000 children under five / day): 1.0 (0.2-5.4, 95% CI)

4.1.6 Alagaya & Dabat Bosin

The percentage of U5 and average household size were derived from ProGres data base. The population used in the survey were presented as shown in Table 4.1.62 below.

Table 4.1. 62: Demographic Characteristics of the study population in Alagaya & Dabat Bosin 2018

Total households planned	299
Total households surveyed	288
Total population surveyed	2,020
Total U5 surveyed	407
Average household size	3.8
% of U5	23.0

Table 4.1. 63: Distribution of age and sex of sample

AGE (mo)	Boys no.	Boys %	Girls no.	Girls %	Total no.	Total %	Ratio Boy:girl
6-17	51	47.2	57	52.8	108	27.3	0.9
18-29	38	45.8	45	54.2	83	21.0	0.8
30-41	38	58.5	27	41.5	65	16.5	1.4
42-53	45	48.4	48	51.6	93	23.5	0.9
54-59	28	60.9	18	39.1	46	11.6	1.6
Total	200	50.6	195	49.4	395	100.0	1.0
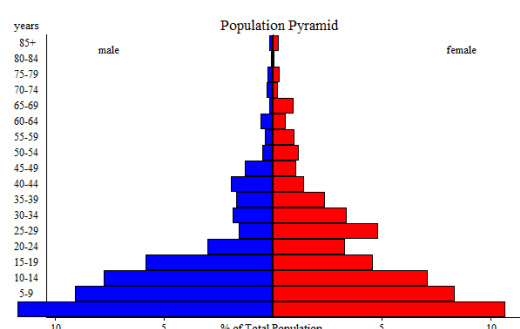
Figure 4. 16: Population age and sex pyramid

Table 4.1. 64: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or Oedema) and by sex

Indicator	All n = 396	Boys n = 200	Girls n = 196
	% (95% C.I.)		
Prevalence of global malnutrition (<-2 z-score and/or Oedema)	(54) 13.6 % (10.6 - 17.4)	(28) 14.0 % (9.9 - 19.5)	(26) 13.3 % (9.2 - 18.7)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no Oedema)	(49) 12.4 % (9.5 - 16.0)	(25) 12.5 % (8.6 - 17.8)	(24) 12.2 % (8.4 - 17.6)
Prevalence of severe malnutrition (<-3 z-score and/or Oedema)	(5) 1.3 % (0.5 - 2.9)	(3) 1.5 % (0.5 - 4.3)	(2) 1.0 % (0.3 - 3.6)

The prevalence of Oedema is 0.0 %

The overall weight-for-height Z-score (and/or Oedema) in Alagaya & Dabat boisn camp has remained within the serious nutrition situation category, with prevalence of Global Acute Malnutrition (GAM) 13.6% (10.6-17.4 C.I) and SAM 1.3% (0.5-2.9 C.I), below the emergency threshold as per the WHO classification (GAM prevalence >15% and SAM >2%). The results showed that there was no significant difference between boys and girls.

Table 4.1. 65: Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or Oedema

Age (mo)	Total no.	Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
		No.	%	No.	%	No.	%	No.	%
6-17	108	4	3.7	24	22.2	80	74.1	0	0.0
18-29	83	1	1.2	7	8.4	75	90.4	0	0.0
30-41	65	0	0.0	5	7.7	60	92.3	0	0.0
42-53	93	0	0.0	10	10.8	83	89.2	0	0.0
54-59	46	0	0.0	3	6.5	43	93.5	0	0.0
Total	395	5	1.3	49	12.4	341	86.3	0	0.0
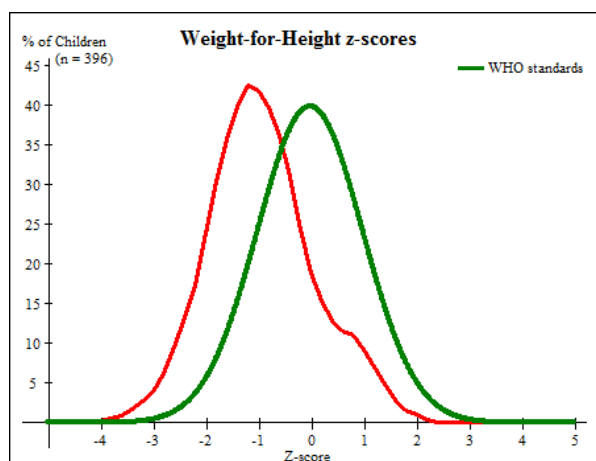
Figure 4. 17: Distribution of weight-for-height z-scores (based on WHO Growth Standards) in

The figure shows that the weight-for-height z-score distribution is slightly shifted to the left, which indicates a poorer nutritional status in comparison to the international WHO Standard population of children aged 6-59 months.

Figure 4. 18: Trend in Prevalence of GAM and SAM in Children 6-59 months Alagaya and Dabat Boisin, Sudan: 2016 – 2018
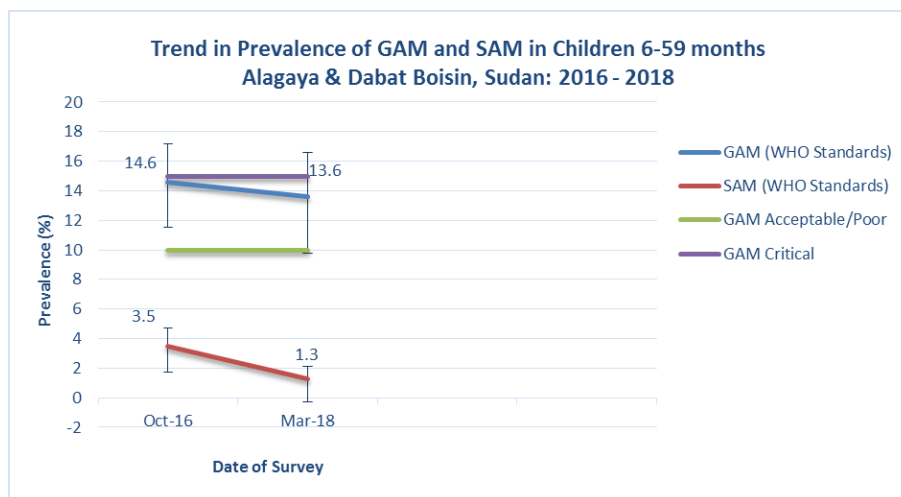
The trend analysis, with respect to comparison of 2016 and 2018 SENS results, the GAM and SAM rate in the Alagaya and Dabat Bosin camp showed no significant difference. The GAM rate was 14.6% and SAM rate was 3.5% in 2016, while the GAM rate was 13.6% and SAM rate was 1.3% in 2018. The SAM rate improved from critical to acceptable nutrition situation category.

Table 4.1. 66: 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. 5 (1.3 %)	Not severely malnourished No. 391 (98.7 %)

Table 4.1. 67: Prevalence of acute malnutrition based on MUAC cut off's (and/or Oedema) and by sex

Indicator	All n = 396	Boys n = 200	Girls n = 196
	% (95 % C.I.)		
Prevalence of global malnutrition (< 125 mm and/or Oedema)	(14) 3.5 % (2.1 - 5.8)	(4) 2.0 % (0.8 - 5.0)	(10) 5.1 % (2.8 - 9.1)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no Oedema)	(12) 3.0 % (1.7 - 5.2)	(2) 1.0 % (0.3 - 3.6)	(10) 5.1 % (2.8 - 9.1)
Prevalence of severe malnutrition (< 115 mm and/or Oedema)	(2) 0.5 % (0.1 - 1.8)	(2) 1.0 % (0.3 - 3.6)	(0) 0.0 % (0.0 - 1.9)

Table 4.1. 68: Prevalence of acute malnutrition by age, based on MUAC cut off's and/or Oedema

Age (mo)	Total no.	Severe wasting (< 115 mm)		Moderate wasting (>= 115 mm and < 125 mm)		Normal (> = 125 mm)		Oedema	
		No.	%	No.	%	No.	%	No.	%
6-17	108	2	1.9	10	9.3	96	88.9	0	0.0
18-29	83	0	0.0	2	2.4	81	97.6	0	0.0
30-41	65	0	0.0	0	0.0	65	100.0	0	0.0
42-53	93	0	0.0	0	0.0	93	100.0	0	0.0
54-59	46	0	0.0	0	0.0	46	100.0	0	0.0
Total	395	2	0.5	12	3.0	381	96.5	0	0.0

Table 4.1. 69: Prevalence of underweight based on weight-for-age z-scores by sex

Indicator	All n = 396	Boys n = 200	Girls n = 196
	% (95% C.I.)		
Prevalence of underweight (<-2 z-score)	(46) 11.6 % (8.8 - 15.1 95% C.I.)	(24) 12.0 % (8.2 - 17.2 95% C.I.)	(22) 11.2 % (7.5 - 16.4 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(44) 11.1 % (8.4 - 14.6 95% C.I.)	(24) 12.0 % (8.2 - 17.2 95% C.I.)	(20) 10.2 % (6.7 - 15.2 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(2) 0.5 % (0.1 - 1.8 95% C.I.)	(0) 0.0 % (0.0 - 1.9 95% C.I.)	(2) 1.0 % (0.3 - 3.6 95% C.I.)

Table 4.1. 70: Prevalence of underweight by age, based on weight-for-age z-scores

Age (mo)	Total no.	Severe underweight (<-3 z-score)		Moderate underweight (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
		No.	%	No.	%	No.	%	No.	%
6-17	108	1	0.9	14	13.0	93	86.1	0	0.0
18-29	83	1	1.2	9	10.8	73	88.0	0	0.0
30-41	65	0	0.0	11	16.9	54	83.1	0	0.0
42-53	93	0	0.0	8	8.6	85	91.4	0	0.0
54-59	46	0	0.0	2	4.3	44	95.7	0	0.0
Total	395	2	0.5	44	11.1	349	88.4	0	0.0

Table 4.1. 71: Prevalence of stunting based on height-for-age z-scores and by sex

Indicator	All n = 396	Boys n = 200	Girls n = 196
	% (95% C.I.)		
Prevalence of stunting (<-2 z-score)	(26) 6.6 % (4.5 - 9.4)	(14) 7.0 % (4.2 - 11.4)	(12) 6.1 % (3.5 - 10.4 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(21) 5.3 % (3.5 - 8.0)	(11) 5.5 % (3.1 - 9.6 95% C.I.)	(10) 5.1 % (2.8 - 9.1 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(5) 1.3 % (0.5 - 2.9)	(3) 1.5 % (0.5 - 4.3 95% C.I.)	(2) 1.0 % (0.3 - 3.6 95% C.I.)

Table 4.1. 72: Prevalence of stunting by age based on height-for-age z-scores

Age (mo)	Total no.	Severe stunting (<-3 z-score)		Moderate stunting (>= -3 and <-2 z-score)		Normal (> = -2 z score)	
		No.	%	No.	%	No.	%
6-17	108	1	0.9	6	5.6	101	93.5
18-29	83	1	1.2	8	9.6	74	89.2
30-41	65	2	3.1	3	4.6	60	92.3
42-53	93	0	0.0	2	2.2	91	97.8
54-59	46	1	2.2	2	4.3	43	93.5
Total	395	5	1.3	21	5.3	369	93.4

Table 4.1. 73: 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	396	-0.93±0.99	1.00	0	0
Weight-for-Age	396	-1.00±0.81	1.00	0	0
Height-for-Age	396	-0.65±0.93	1.00	0	0

* contains for WHZ and WAZ the children with edema.

3.2 Mortality results (retrospective over three months/90 days prior to interview)

CMR (total deaths/10,000 people / day): 0.3 (0.1-1.2, 95% CI)
U5MR (deaths in children under five/10,000 children under five / day): 0.7 (0.1-7.4, 95% CI)

4.2.   Programme Coverage and health indicators

4.2.1   Nutrition Feeding programme Enrolment Results

Table 4.2. 1: Enrolement coverage for acutely malnourished children

	Khor Alwaral	Um Sangour	Al Radis 1&2	El Kashafa	Jouri	Alagaya & Dabat Bosin
	% (95% CI)					
Supplementary feeding program (based on all admission criteria WHZ, Oedema and MUAC)	16.6% (0.4-64.1)	10.0% (0.2-44.5)	71.4% (29.0-96.3)	20.0% (0.5-71.6)	21.4% (4.6-50.8)	28.5% (3.6-57.8)
Supplementary feeding program based on MUAC admission criteria	4.1% (48.9-87.3)	20.0% (0.5-71.6)	66.6% (9.4-99.1)	100.0%	50.0% (1.2-98.7)	(2/2) 100.0%
Therapeutic feeding program based on all admission criteria WHZ, Oedema and MUAC	62.0% (48.3-74.4)	52.8% (38.6-66.7)	80.0% (67.6-89.2)	83.6% (79.3-87.2)	64.2% (48.0-78.4)	76.6% (63.9-86.6)
Therapeutic feeding program based on MUAC admission criteria	64.7% (38.3-87.5)	14.2% (1.7-42.8)	66.6% (29.9-92.5)	50.0% (15.7-84.3)	30.0% (6.6-65.2)	66.6% (34.8-90.0)

Enrolment of SAM and MAM cases in the nutrition programme during the time of survey was relatively better in El Kashafa, Al Radis 1&2 camps. Nutrition programme coverage was registered as follows: 83.6% SAM and 100.0% MAM in El Kashafa; and 80.0% SAM and 71.4% MAM in Al Radis 1&2. Whereas in Khor Alwaral, Um Sangour, Jouri, Alagaya and Dabat Bosin camps the results were far below the expected standard of >90% in the camp setting. One of the major reasons could be related to the fact that only MUAC was used as admission criteria in nutrition programme. Other contributing factors include poor active case finding and community/outreach interventions.

Figure 4. 19: Enrolment status in the nutrition program by all criteria (MUAC, WFH and Oedema)
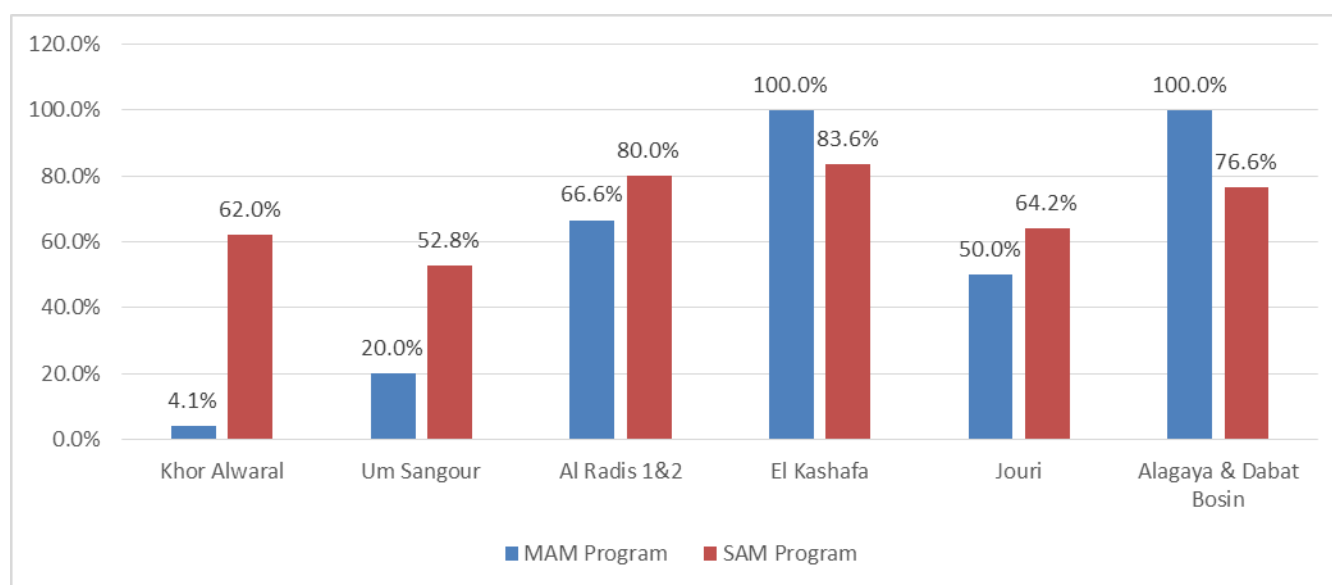
4.2.2 Measles vaccination coverage results

Table 4.2. 2: Measles vaccination coverage for children aged 9-59 months

Camps	Response	Measles: (with card)		Measles: (with card or confirmation from mother)	
		n/N=	% (95% CI)	n/N=	% (95% CI)
Khor Alwaral	YES	87/317	27.4% (22.8-32.6)	282/317	88.9% (85.0-91.9)
Um Sangour	YES	72/295	24.4% (19.6-29.7)	255/295	86.2% (81.8-89.9)
Al Radis 1 & 2	YES	109/299	36.4% (30.9-42.1)	269/299	89.6% (85.7-92.6)
El Kashafa	YES	118/302	39.0% (33.7-44.6)	302/302	100%
Jouri	YES	101/315	32.0% (27.1-37.4)	298/315	93.7% (90.4-95.8)
Alagaya & Dabat Bosin	YES	143/353	40.51% (35.5-45.7)	335/353	94.9% (91.9-96.9)

4.2.3 Vitamin A supplementation coverage results

Table 4.2. 3: Vitamin A supplementation for children aged 6-59 months within past 6 months

Camps	Response	Vitamin A capsule: (with card)		Vitamin A capsule: (with card or confirmation from mother)	
		n/N	% (95% CI)	n/N	% (95% CI)
Khor Alwaral	YES	93/346	26.8% (22.4-31.7)	301/346	86.9% (83.0-90.1)
Um Sangour	Yes	80/323	24.7% (20.3-29.7)	242/323	74.9% (69.9-79.3)
Al Radis 1 & 2	Yes	109/325	33.5% (28.6-38.8)	296/325	91.0% (87.4-93.7)
El Kashafa	Yes	109/336	32.4% (27.6-37.6)	336/335	100%
Jouri	Yes	95/348	27.3% (22.8-32.2)	287/348	82.4% (78.1-86.1)
Alagaya & Dabat Bosin	Yes	149/396	37.6% (33.0-42.5)	373/396	94.2% (91.3-96.2)

Figure 4. 20 Trend for Measles vaccination and Vitamin A supplementation coverage by card and recall in 2016 &2018
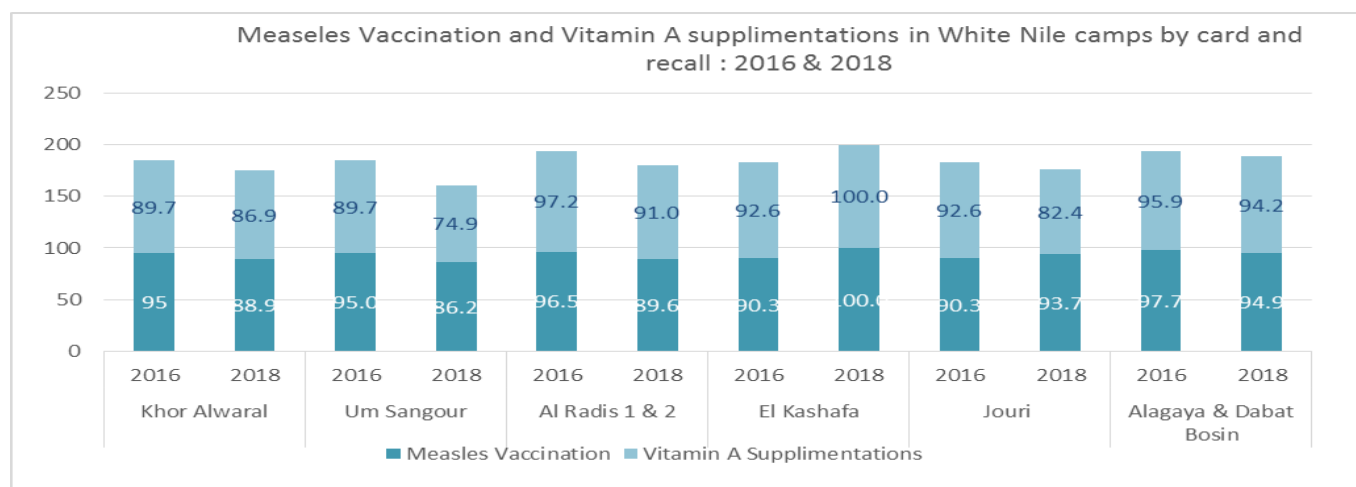
The coverage of measles vaccination among children age 9 to 59 months and Vitamin A supplementation in the past six weeks among children age 6-59 months showed a relatively better result for the information collected by card and recall from the mother or caregivers. There were no significant differences between the two surveys in 2016 and 2018. Better achievement was observed in El Kashafa 100%, Alagaya &Dabat Bosin i.e. 94.9% Measles and 94.4% Vitamin A supplementation. The lowest result was observed in Um Sangour camp i.e 82.6% Measles and 74.9 Vitamin A supplementation.

Figure 4. 21: Trends Covergaes of Measles vaccination and Vitamin A supplimnetations by card only in 2016 &2018
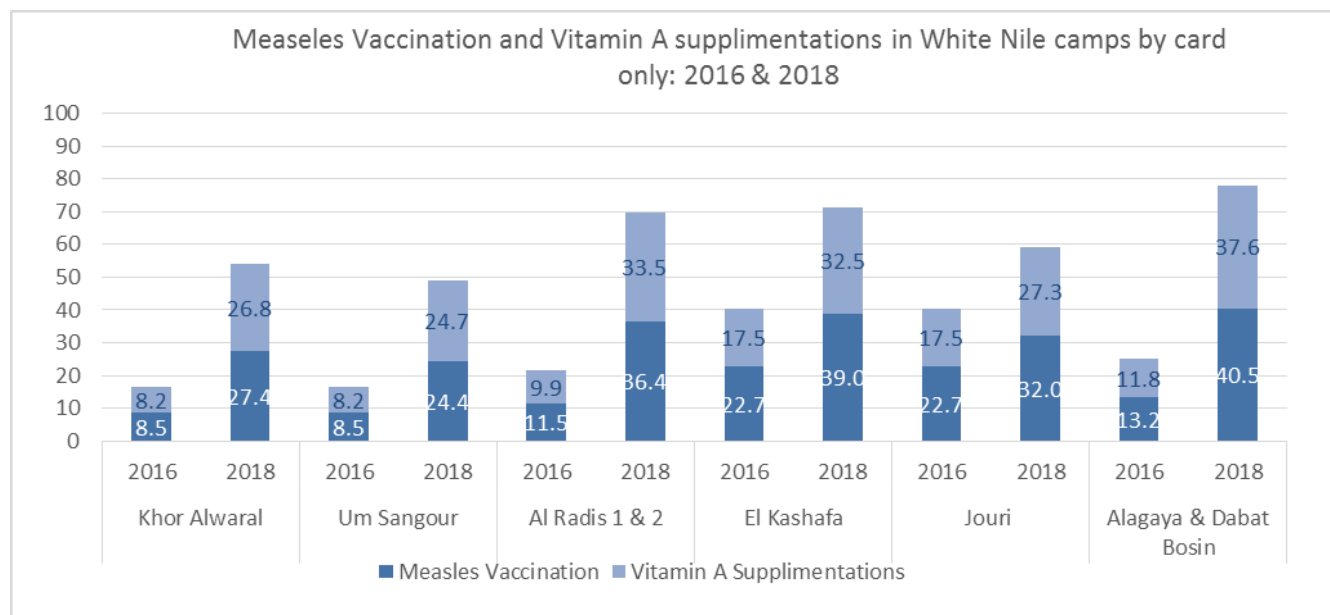
The coverage of measles and vitamin A supplementation by card only was far below the UNHCR standard. It is worth noting that information from a card is the most reliable source of data to measure performance. Poor performance by card could be associated with irregular administration of cards from the health facility or due to poor retention of cards by the family. Nevertheless, the 2018 survey revealed some good progress compared to the 2016 survey.

4.2.4 Diarrhoea results among children age 6-59 months

Table 4.2. 4 : Two weeks period prevalence of diarrhoea among children age 6-59 months

Diarrhoea in the last two weeks	Number/total	%	(95% CI)
Khor Alwaral	44/345	12.7%	(9.6-16.6)
Um Sangour	77/323	23.8%	(19.5-28.7)
Al Radis 1 & 2	49/325	24.7%	(20.3-29.7)
El Kashafa	42/336	12.5%	(9.3-16.4)
Jouri	76/348	21.8%	(17.8-26.4)
Alagaya & Dabat Bosin	63/396	15.9%	(12.6-19.8)

Figure 4. 22: Trends Diarrhoea in the past two weeks among children age 6 to 59 months in 2016 &2018
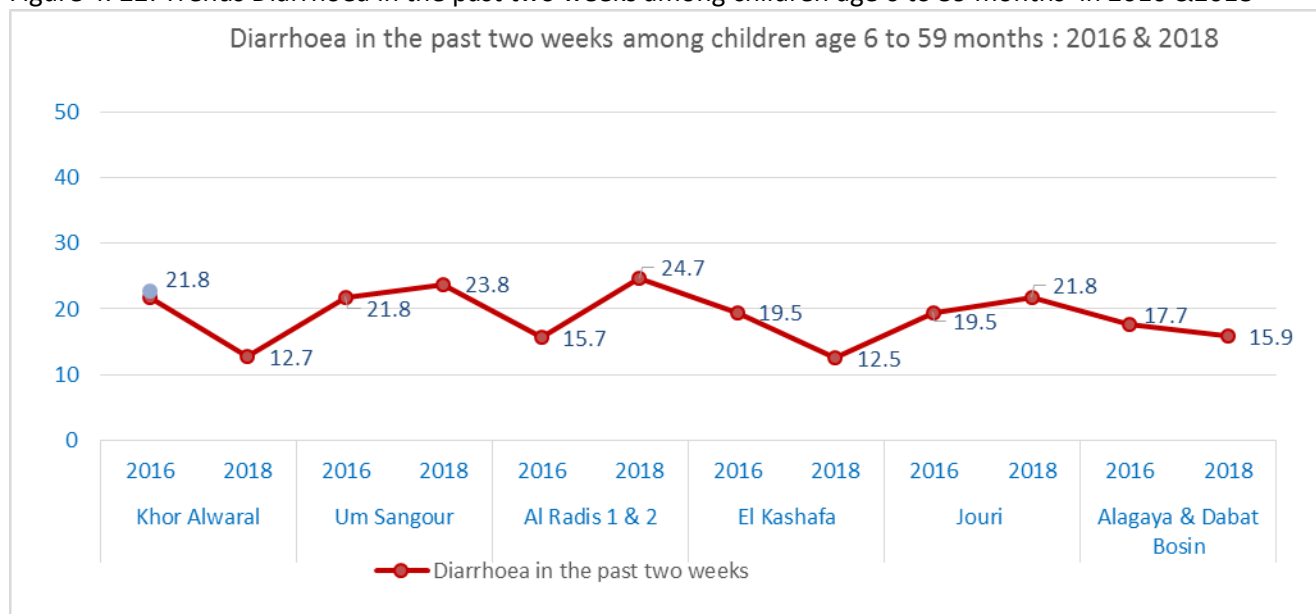
Children 6-59 months of age who had diarrhoea in the past two weeks prior to the survey date were high in White Nile camps in both 2016 and 2018. A higher diarrheal rate was recorded in 2018 than 2016. The highest diarrheal rate was reported in Al Radis 1 & 2 at 24.7%. This was followed by 23.8% in Um Sangour and 21.8% in Jouri.

4.2.5 Anaemia results among children age 6 to 59 months

Table 4.2. 5: Prevalence of TOTAL anaemia and MEAN haemoglobin concentration in children 6-59 months of age

Anaemia – Children 6-59 months	Khor Alwaral	Um Sangour	Al Radis 1 & 2	El Kashafa	Jouri	Alagaya & Dabat Bosin
	% (95% CI)					
Total Anaemia (Hb<11.0 g/dL)	46.8% (41.9-51.7)	23.0% (18.7-27.9)	38.4% (33.3-43.8)	38.3% (33.3-43.7)	42.7% (37.7-48.1)	44.8% (39.9-49.7)
Mild Anaemia (Hb 10.0-10.9 g/dL)	26.1% (21.7-31.1)	16.5% (12.7-20.8)	21.5% (17.4-26.3)	19.0% (15.2-23.5)	22.1% (18.0-26.8)	24.0% (20.1-28.5)
Moderate Anaemia (7.0-9.9 g/dL)	17.7% (13.9-22.1)	5.6% (3.6-8.8)	16.3% (12.6-20.7)	19.3% (15.4-23.9)	20.4% (16.4-24.9)	20.5% (16.8-24.7)
Severe Anaemia (<7.0 g/dL)	3.0% (1.6-5.4)	0.9% (0.3-2.7)	0.6% (0.1-2.2)	0.0%	0.2% (0.1-1.6)	0.3% (0.04-1.4)
Mean Hb, g/Dl (confidence interval) [range]	10.9 g/dl 2.3 SD (6.2 Min, 18.3 Max)	11.7 g/dl 1.7 SD (6.3 Min, 17.7 Max)	11.1g/dl 1.8 SD (6.2 Min, 15.2 Max)	11.1g/dl 1.9 SD (7.1Min, 16.2Max)	11.0g/dl 1.8 SD (5.9 Min, 16.1 Max)	10.9g/dl 1.7 SD (6.8Min, 18.8 Max)

Figure 4. 23: Trend of Prevalence of Anaemia among children 6 to 59 months in White Nile camps 2016 and 2018

In comparison with 2016 results, the total anaemia among children 6 to 59 months age did not change significantly in respective locations with exception of Um Sangour camp where this significantly dropped from 54.0 % in 2016 to 23.0% in 2018.

Table 4.2. 6: Prevalence of Anaemia in children 6-59 months of age BY AGE GROUP

Children 6-59 by age category	Anaemia – category	Khor Alwaral	Um Sangour	Al Radis 1 & 2	El Kashafa	Jouri	Alagaya & Dabat Bosin
		% (95% CI)					
6-23 Months	Total Anaemia (Hb<11.0 g/dL)	69.0% (59.7-77.2)	35.1% (26.3-44.8)	60.0% (50.4-69.0)	61.0% (51.8-69.6)	59.0% (49.5-68.0)	51.4% (42.8-60.0)
	Mild Anaemia (Hb 10.0-10.9 g/dL)	33.6% (25.1-43.0)	22.5% (15.1-31.4)	33.9% (25.3-43.3)	24.4% (17.1-33.0)	26.5% (18.8-35.5)	24.3% (17.4-32.2)
	Moderate Anaemia (7.0-9.9 g/dL)	31.0% (22.8-40.3)	11.7% (6.4-19.2)	25.2% (17.6-34.2)	36.6% (28.1-45.7)	31.6% (23.3-40.9)	26.4% (19.3-34.5)
	Severe Anaemia (<7.0 g/dL)	4.3% (1.4-9.8)	0.9% (0.0-4.9)	0.9% (0.0-4.7)	0.0%	0.9% (0.0-4.7)	0.7% (0.0-3.9)
24-35 months	Total Anaemia (Hb<11.0 g/dL)	38.2% (26.7-50.8)	26.8% (15.8-40.3)	40.7% (27.6-55.0)	41.5% (29.4-54.4)	43.1% (30.2-56.8)	53.6% (42.4-64.5)
	Mild Anaemia (Hb 10.0-10.9 g/dL)	22.1% (12.9-33.8)	19.6% (10.2-32.4)	20.4% (10.6-33.5)	27.7% (17.3-40.2)	12.1% (5.0-23.3)	29.8% (20.3-40.7)
	Moderate Anaemia (7.0-9.9 g/dL)	14.7% (7.3-25.4)	3.6% (0.4-12.3)	20.4% (10.6-33.5)	13.8% (6.5-24.7)	31.0% (19.5-44.5)	23.8% (15.2-34.3)
	Severe Anaemia (<7.0 g/dL)	1.5% (0.0-7.9)	3.6% (0.4-12.3)	0.0%	0.0%	0.0%	0.0%
36-59 months	Total Anaemia (Hb<11.0 g/dL)	33.6% (26.0-41.7)	12.7% (7.8-19.1)	21.8% (15.6-29.1)	18.6% (12.6-25.9)	31.5% (24.6-39.2)	34.7% (27.6-42.4)
	Mild Anaemia (Hb 10.0-10.9 g/dL)	22.1% (15.8-29.7)	10.7% (6.2-16.7)	12.8% (8.0-19.1)	11.0% (6.4-17.3)	22.6% (16.5-29.7)	21.2% (15.3-28.1)
	Moderate Anaemia (7.0-9.9 g/dL)	8.7% (4.7-14.5)	2.0% (0.4-5.7)	8.3% (4.5-13.8)	7.6% (3.8-13.2)	8.9% (5.1-14.3)	13.5% (8.8-19.6)
	Severe Anaemia (<7.0 g/dL)	2.7% (0.7-6.7)	0.0%	0.6% (0.0-3.5)	0.0%	0.0%	0.0%

Prevalence of total anaemia is highest amongst the children 6-23 months age category, ranging between 35.5% and 69.0%. Only Um Sangour camp registered lower than 40.% anaemia prevalence within this age category. Therefore, younger children are at a higher risk of anaemia. An indepth understanding of underlying risk factors need to be explored on this.

4.2.6   Infant and Young Child Feeding practices (IYCF) Indicators, Children 0-23 months of age

Table 4.2. 7: Prevalence of Infant and Young Child Feeding Practices Indicators

Indicator	Age range	Khor Alwaral	Um Sangour	Al Radis 1 & 2	El Kashafa	Jouri	Alagaya & Dabat Bosin
		% (95% CI)					
Timely initiation of breastfeeding	0-23 mon	82.5% (75.0-88.6)	85.0% (77.8-90.6)	92.4% (86.5-96.3)	82.6% (75.4-88.4)	84.5% (77.0-90.2)	90.6% (84.8-94.8)
Exclusive breastfeeding under 6 months	0-5 mon	46.1% (19.2-74.8)	40.0% (19.1-63.9)	47.0% (22.9-72.1)	38.1% (18.1-61.5)	70.0% (34.7-93.3)	30.0% (6.6-65.2)
Continued reastfeeding at 1 year	12-15 mon	80.7% (60.6-93.4)	92.8% (76.5-99.1)	83.3% (62.6-95.2)	90.6% (74.9-98.0)	86.3% (65.0-97.0)	96.7% (83.3-99.9)
Continued breastfeeding at 2 ears	20-23 mon	42.8% (21.8-65.9)	42.8% (21.8-65.9)	44.0% (24.4-65.0)	47.8% (26.8-69.4)	36.0% (17.9-57.4)	76.0% (54.8-90.6)
Introduction of solid, semi-solid or soft foods	6-8 mon	24.0% (9.3-45.1)	16.6% (4.7-37.3)	28.5% (11.2-52.1)	11.7% (3.3-27.4)	14.2% (4.0-32.6)	27.0% (13.7-44.1)
Consumption of iron-rich or iron-fortified foods	6-23 mon	77.6% (68.4-85.2)	55.9% (46.1-65.4)	85.4% (77.1-91.6)	83.3% (75.2-89.6)	76.3% (67.3-83.9)	78.5% (70.3-85.3)
Bottle feeding	0-23 mon	1.6% (0.2-5.7)	3.1% (0.8-7.8)	3.2% (0.8-7.9)	3.5% (1.1-8.0)	4.0% (1.3-9.1)	7.4% (3.7-12.9)

Figure 4. 24: Trend of Key IYCF Indicators in White Nile camps
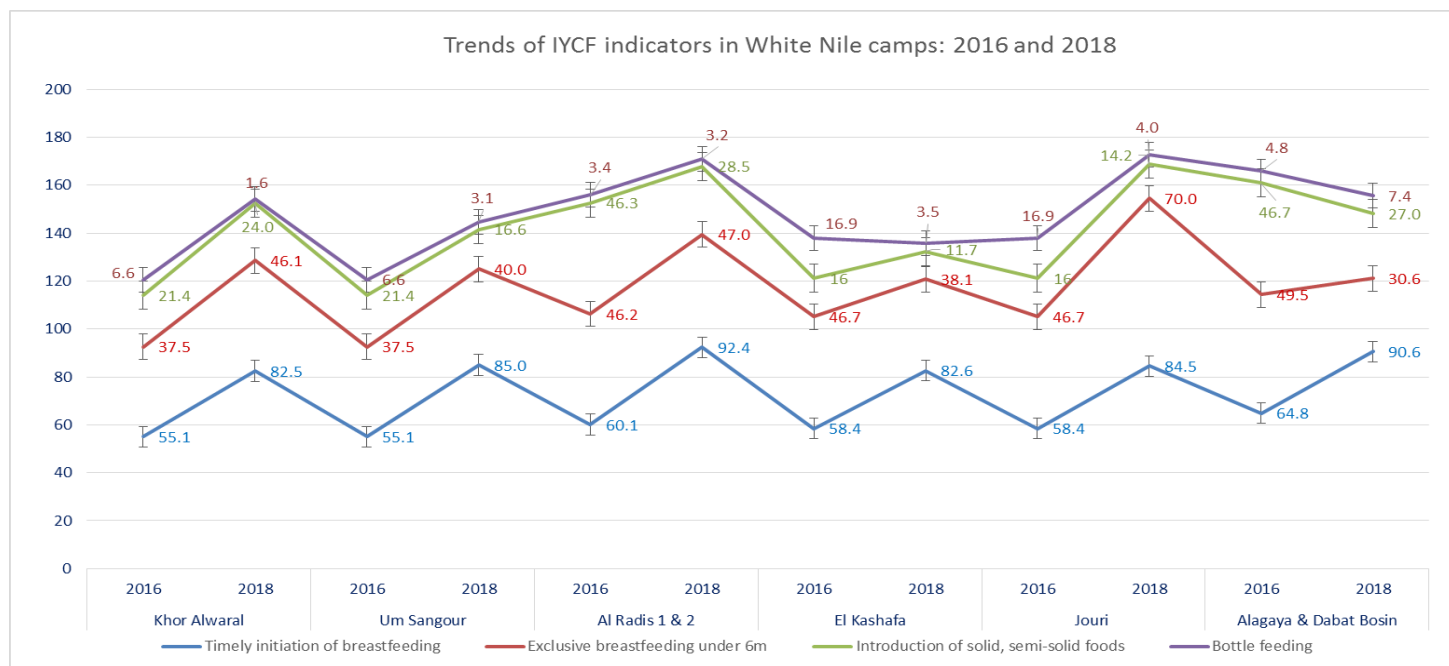
In general, results of key IYCF indicators in all camps showed significant improvement in 2018 compared to 2016. However, some of the indicator values are still low e.g. exclusive breastfeeding, and the introduction of solid, semi-solid or soft foods. Best results for exclusive breastfeeding were registered in Jouri i.e. 70.0%, while this was below 50% in the rest of the camps, ranging from 30.6% in Alagaya & Dabat Bosin to 47.0% in Al Radis 1&2. Introduction of solid, semi-solid or soft foods at six months of age was low in all locations. The lowest was registered in El Kashafa 11.7% and the highest was reported in Al Radias 1&2 28.5%. Breastfeeding alone is not adequate for children above six months to support linear growth and development.

4.2.7 Women age 15-49 years

Table 4.2. 8: Women physiological status and age

Physiological status	Khor Alwaral	Um Sangour	Al Radis 1 & 2	El Kashafa	Jouri	Alagaya & Dabat Bosin
Non-pregnant	112	98	122	125	172	125
Pregnant	23	16	10	15	14	15
Mean age (range)	27 (15Min, 49Max)	28 (15Min, 46 Max)	27 (15Min, 48Max)	28 (15 Min,48 max)	25 (15Min, 48Max)	27 (15min, 45 Max)

Table 4.2. 9: Prevalence of anaemia and haemoglobin concentration in non-pregnant women of reproductive age (15-49 years)

Anaemia – in non-pregnant women of reproductive age (15-49 years)	Khor Alwaral	Um Sangour	Al Radis 1 & 2	El Kashafa	Jouri	Alagaya & Dabat Bosin
	% (95% CI)					
Total Anaemia (<12.0 g/dL)	21.8% (14.5-30.7)	27.1% (18.5-37.1)	27.8% (20.1-36.7)	17.4% (11.7-24.5)	33.7% (26.7-41.3)	40.8% (32.1-49.9)
Mild Anaemia (11.0-11.9 g/dL)	11.8% (6.4-19.3)	15.6% (9.0-24.4)	20.5% (13.7-28.7)	8.1% (4.2-13.6)	21.5% (15.6-28.4)	26.4% (18.9-35.0)
Moderate Anaemia (8.0-10.9 g/dL)	7.3% (3.1-13.8)	11.5% (5.8-19.5)	7.3% (3.4-13.5)	8.7% (4.7-14.4)	11.1% (6.7-16.7)	13.6% (8.1-20.8)
Severe Anaemia (<8.0 g/dL)	2.7% (0.5-7.7)	0.0%	0.0%	0.6% (0.0-3.6)	1.1% (0.1-4.1)	0.8% (0.0-4.3)
Mean Hb (g/dL) (SD / 95% CI) [range]	12.8 g/dl 3.8 SD (6.6 Min, 19.0 Max)	12.7 g/dl 2.3 SD (8.8 Min, 19.0 Max)	12.8 g/dl 2.2 SD (10.0 Min, 19.0 Max)	12.9 g/dl 2.0 SD (7.2 Min, 17.7 Max)	12.4 g/dl 2.0 SD (6.9 Min, 19.0 Max)	12.3 g/dl 1.9SD (7.2Min, 15.2 Max)

Figure 4. 25: Trend analysis, Prevalence of Anaemia among women 15-49 years (non-pregnant) in White Nile camps: 2016 and 2018
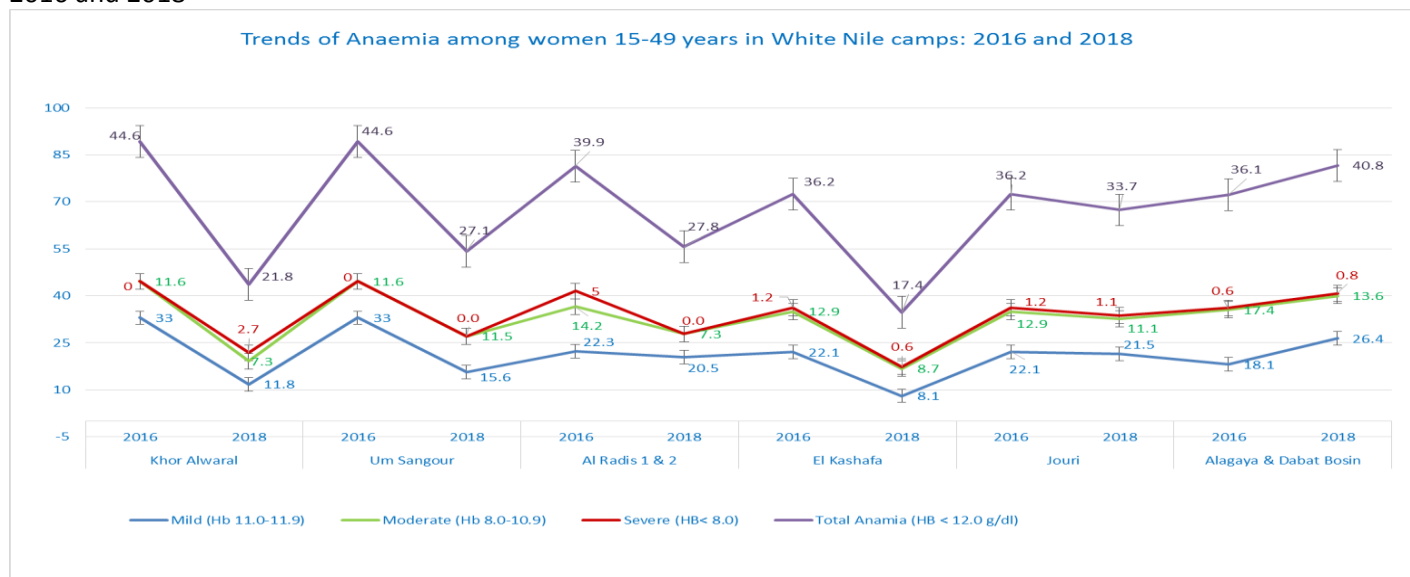
Unlike amongst children, anaemia level among women of reproductive age showed some improvement, most especially in El Kashafa camp (from 36.2% to 17.4%). Results of prevalence of anaemia in Khor Alwaral, Umsangour and Alradias 1&2 within the moderate anaemia category (range of 20-30%), while the highest were recorded in Jouri and Alagaya and Dabat Bosin i.e 36.1 % and 40.8% respectively.

Table 4.2. 10 : ANC enrolment and iron-folic acid pills coverage among pregnant women (15-49 years)

	Khor Alwaral	Um Sangour	Al Radis 1 & 2	El Kashafa	Jouri	Alagaya & Dabat Bosin
	% (95% CI)					
Currently enrolled in ANC programme	55.0% (31.5-76.9)	25.0% (7.2-52.3)	90.0% (55.5-99.7)	70.5% (44.0-89.6)	78.5% (49.2-95.3)	86.6% (59.5-98.3)
Currently receiving iron-folic acid pills	50.0% (27.2-72.8)	25.0% (7.2-52.3)	90.0% (55.5-99.7)	70.5% (44.0-89.6)	69.2% (38.5-90.9)	73.3% (44.9-92.2)

ANC and Iron folic acid coverage was significantly low in Um Sangour and Khor Alwaral camp i.e 25.0% and 55.0% respectively.

4.2.8 Food security in White Nile camps 2018

Table 4.2. 11: Food security sampling

Household surveyed for food security	Khor Alwaral	Um Sangour	Al Radis 1 & 2	El Kashafa	Jouri	Alagaya & Dabat Bosin
Planned	152	168	182	185	198	177
Actual	130	136	151	150	170	168
% of target	85.5%	80.9%	82.9%	81.1%	85.8%	94.9%

Access to food assistance results

Table 4.2. 12: Ration card coverage

	Khor Alwaral	Um Sangour	Al Radis 1 & 2	El Kashafa	Jouri	Alagaya & Dabat Bosin
	% (95% CI)					
Proportion of households with a ration card	98.5% (94.5-99.8)	99.3% (95.9-99.9)	100.0%	100.0%	100.0%	98.8% (95.7-99.8)
Proportion of households reporting that the food ration last the entire duration of the cycle (30 days)	74.3%	55.0%	77.3%	75.0%	87.6%	73.3%

In Jouri, Elkashafa and Al Radias 1&2 camps all assessed families (100.0%) had a ration card to access general food assistance. However, in Khor Alwaral, Um Sangour and Alagaya & Dabat Bosin only a few families indicated that they didn't receive ration card due to reasons associated with registration. It is most likely that these were new arrivals.

Interviewed households indicated that that the food ration distributed prior to the time of the survey (for the month of February) didn't last the entire duration of the cycle (30 days) for all families. About 45.0% of families in Um Sangour and 25.0% of families in the other the camps indicated that their food ration failed to cover the entire duration of the month.

Table 4.2. 13: Coping strategies used by the surveyed population over the past month

Proportion of households reporting using the following coping strategies over the past month*:	Khor Alwaral	Um Sangour	Al Radis 1 & 2	El Kashafa	Jouri	Alagaya & Dabat Bosin
	% (95% CI)					
Borrowed cash, food or other items	50.0% (41.1-58.8)	54.4% (45.6-62.9)	57.6% (49.3-65.6)	48.7% (40.4-56.9)	48.5% (40.7-56.3)	50.3% (42.4-58.1)
Sold any assets (furniture, seed stocks, tools, other NFI, livestock etc.)	8.5% (4.3-14.6)	11.0% (6.3-17.5)	16.5% (11.0-23.4)	15.3% (9.9-22.1)	14.1% (9.2-20.2)	17.8% (12.3-24.5)
Requested increase remittances or gifts as compared to normal	32.3% (24.3-41.0)	24.6% (17.6-32.8)	29.8% (22.6-37.7)	32.7% (25.2-40.7)	24.1% (17.9-31.2)	22.6% (16.5-29.7)
Reduced the quantity and/or frequency of meals	46.9% (38.1-58.1)	52.9% (44.2-61.5)	45.0% (36.9-53.3)	38.3% (30.4-46.5)	37.6% (30.3-45.3)	36.3% (29.0-44.0)
Begged	3.8% (1.2-8.7)	11.0% (6.3-17.5)	5.3% (2.3-10.1)	2.7% (0.7-6.6)	4.7% (2.0-9.0)	13.1% (8.3-19.1)
Engaged in potentially risky or harmful activities (Cutting live trees, smuggling, etc.)	42.3% (33.7-51.2)	65.4% (56.8-73.3)	39.0% (31.2-47.3)	56.0% (47.6-64.0)	47.6% (39.9-55.4)	61.9% (54.1-69.2)
Proportion of households reporting using none of the coping strategies over the past month	10.0% (5.4-16.4)	3.7% (1.2-8.3)	13.3% (8.2-19.7)	8.0% (4.2-13.5)	16.4% (11.2-22.9)	7.1% (3.7-12.1)

* The total will be over 100% as households may use several negative coping strategies.

Figure 4. 26: Coping strategies used by the surveyed population over the past month in White Nile camps: 2018
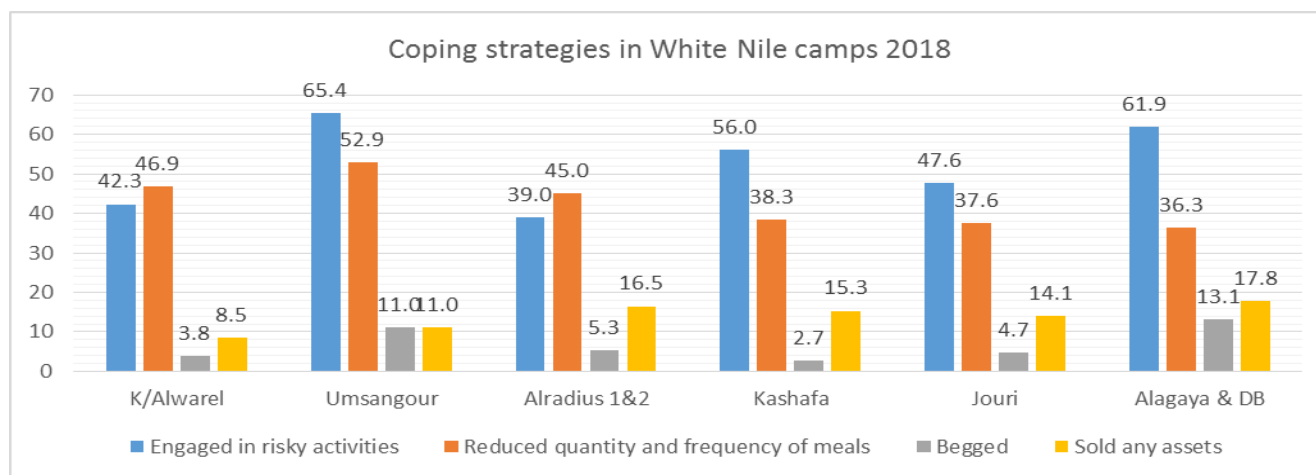
Interviewed households reported engaging in various forms of coping strategies to fulfil unmet basic needs. Among others, potentially risky activities and reduced daily food intake were widely exercised. Risky activities included: violating the country's law (cutting live trees, alcohol making and selling etc.), sending young boys and girls to risky activities which was recorded as low as 39.0% in Al Radis camp and as high as 65.4% in Um Sangour camp.

4.2.9 WASH in White Nile Camps 2018

Table 4.2. 14: WASH sampling

Household surveyed for WASH	Khor Alwaral	Um Sangour	Al Radis 1 & 2	El Kashafa	Jouri	Alagaya & Dabat Bosin
Planned	152	168	182	185	198	177
Actual	132	137	151	148	170	165
% of target	86.8%	81.5%	82.9%	80.0%	85.8%	93.2%

Table 4.2. 15 Water Quality

Indicators	Khor Alwaral	Um Sangour	Al Radis 1 & 2	El Kashafa	Jouri	Alagaya & Dabat Bosin
	% (95% CI)					
Proportion of households using an improved drinking water source	100.0%	100.0%	100.0%	100.0%	100.0%	100%
Proportion of households that use a covered or narrow necked container for storing their drinking water	72.7% (64.2-80.1)	58.3% (49.6-66.7)	65.5% (57.4-73.1)	56.0% (47.6-64.2)	61.0% (53.2-68.5)	58.7% (50.8-66.3)

Households in White Nile camps access water from safe sources.

TABLE 3.1. 1 : Water Quantity: Amount of litres of water used per person per day

Proportion of households that use:	Khor Alwaral	Um Sangour	Al Radis 1 & 2	El Kashafa	Jouri	Alagaya & Dabat Bosin
	% (95% CI)					
≥ 20 lpppd	48.5% (39.7-57.3)	32.8% (25.0-41.3)	58.9% (50.6-66.8)	58.8% (50.4-66.8)	69.4% (61.8-76.2)	16.9% (11.5-23.5)
15 – <20 lpppd	22.7% (15.8-30.8)	16.1% (10.3-23.3)	23.8% (17.2-31.4)	25.0% (18.2-32.7)	16.5% (11.2-22.9)	59.4% (51.4-66.9)
<15 lpppd	28.8% (21.4-37.3)	51.1% (42.4-59.7)	17.2% (11.5-24.2)	16.2% (10.6-23.1)	14.1% (9.2-20.2)	23.6% (17.3-30.8)
Average consumption (Liters per person per day)	18.9	16.0	21.7	21.8	23.6	21.4

The amount of water used per person per day varied between the camps. 51.1% of households in Um Sangour reported daily water supply per person per day <15 lpppd. This was followed by Khor Alwaral at 28.8%, Alagaya & Dabat Bosin at 23.6%, Al Radis 1&2 at 17.2%, El Kashafa at 16.2% and Jouri at 14.1% . However, the average consumption liters per person per day for the 24 hours recall period ranged between 16.0 and 23.6 in Umsangour and Jouri camp respectively. This implies that there could be disportionate water distribution and

consumption between families. It is also possible that a considerable proportion of available water is used for commercial purposes (including but not limited to restaurants).

Table 4.2. 16: Satisfaction with water supply

	Khor Alwaral	Um Sangour	Al Radis 1 & 2	El Kashafa	Jouri	Alagaya & Dabat Bosin
	% (95% CI)					
Proportion of households that say they are satisfied with the drinking water supply	54.2% (45.2-62.9)	23.4% (16.5-31.3)	58.0% (49.6-66.0)	72.3% (64.3-79.3)	66.5% (58.8-73.5)	70.3% (62.7-77.1)

Figure 4. 27: Proportion of households that say they are satisfied with the drinking water supply in White Nile camps 2018
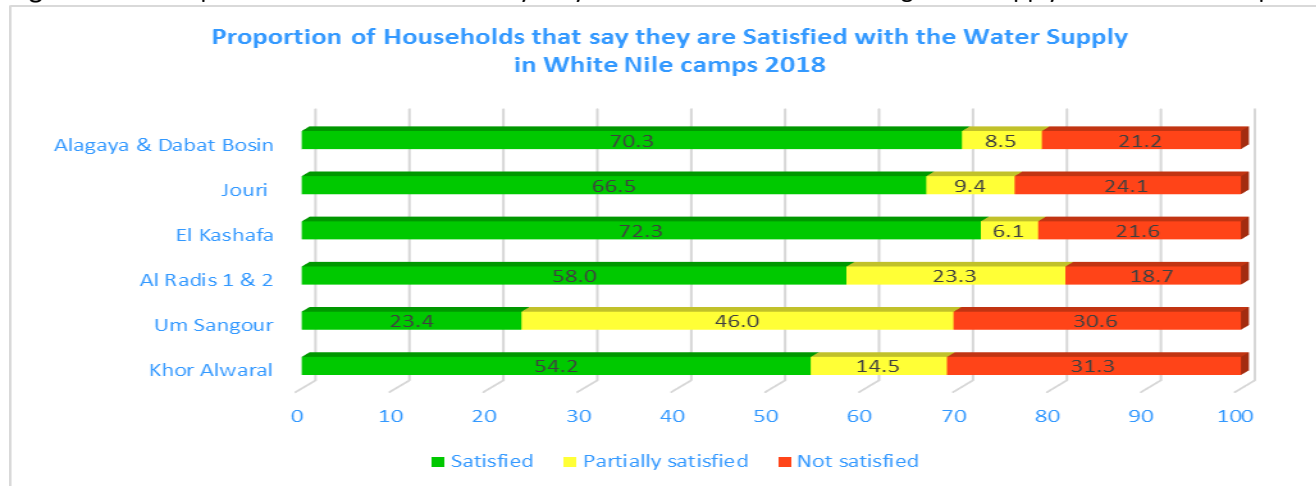
As shown in figure 4.27 above, the proportion of households that were satisfied with the drinking water supply was lowest in Umsangour and Khor Alwaral camps (i.e 23.4% and 54.2% respectively). Conversely, households that were not satisfied with water supply ranged between 31.3% and 18.7% in Khor Alwaral and Al Radis 1&2 respectively.

Table 4.2. 17: SAFE Excreta disposal

Proportion of households that use:	Khor Alwaral	Um Sangour	Al Radis 1 & 2	El Kashafa	Jouri	Alagaya & Dabat Bosin
	% (95% CI)					
An improved excreta disposal facility (improved toilet facility, 1 household)	0.8% (0.0-4.1)	1.5% (0.1-5.2)	0.0%	0.0%	0.0%	0.0%
A shared family toilet (improved toilet facility, 2 households)	3.8% (1.2-8.6)	0.7% (0.0-4.0)	1.4% (0.1-4.8)	0.7% (0.0-3.9)	0.7% (0.0-3.6)	0.6% (0.0-3.5)
A communal toilet (improved toilet facility, 3 households or more)	75.6% (67.3-82.6)	77.2% (69.2-83.9)	68.0% (59.8-75.4)	67.4% (58.9-75.1)	75.8% (68.2-82.3)	74.5% (66.9-81.1)
An unimproved toilet (unimproved toilet facility or public toilet)	19.8% (13.3-27.70)	20.6% (14.1-28.3)	30.6% (23.2-38.7)	31.9% (24.2-40.3)	23.5% (17.0-31.0)	24.8% (18.3-32.3)
Proportion of households with children under three years old that dispose of faeces safely	72.5% (62.1-81.3)	56.5% (45.2-67.2)	58.5% (47.8-68.5)	61.1% (50.2-71.2)	69.7% (59.6-78.5)	70.4% (60.8-78.7)

As shown above, unimproved latrine usage ranged between 19.8% and 31.9%. Additionally, the proportion of households that use shared communal latrine (3 or more households) was high (ranging between 67.4% and 77.2%), below the UNHCR standard, contributing to increased health risks.

4.2.10 Mosquito Net Coverage in White Nile camps 2018

Table 4.2. 18: Mosquito net coverage sampling information

Household surveyed for Mosquito net	Khor Alwaral	Um Sangour	Al Radis 1 & 2	El Kashafa	Jouri	Alagaya & Dabat Bosin
Planned	152	168	182	185	198	177
Actual	129	141	151	150	173	171
% of target	84.8%	83.9%	82.9%	81.1%	87.3%	96.6%

Table 4.2. 19 : Household Mosquito net ownership

	Khor Alwaral	Um Sangour	Al Radis 1 & 2	El Kashafa	Jouri	Alagaya & Dabat Bosin
	% (95% CI)					
Proportion of total households owning at least one mosquito net of any type	49.6% (40.6-58.5)	19.2% (13.0-26.6)	76.8% (69.2-83.2)	69.3% (61.2-76.5)	72.3% (64.9-78.7)	68.4% (60.8-75.3)
Proportion of total households owning at least one LLIN	44.9% (36.2-53.9)	15.6% (10.0-22.6)	75.5% (67.8-82.1)	69.3% (61.2-76.5)	72.3% (64.9-78.7)	68.4% (60.8-75.3)

Proportion of HH owning mosquito net of any type and LLIN was low (ranging between 19.2% to 72.3%).

Figure 4. 28: Trends of Mosquito net ownership of any type in White Nile camps 2016 and 2018
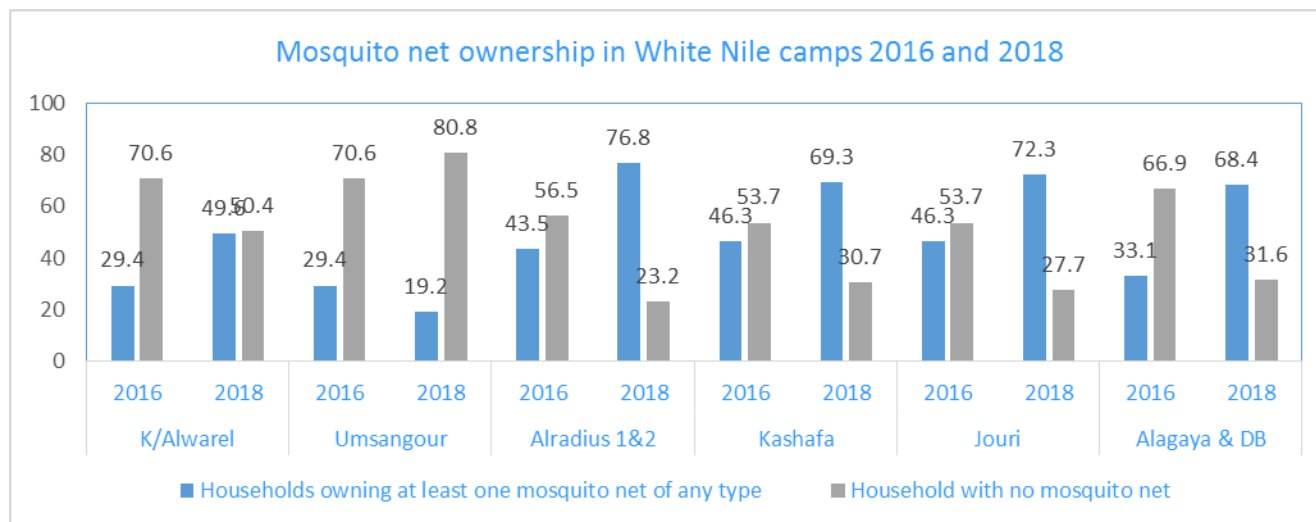
As shown in firgure 4.28, there was slight improvement in ownership of mosquito net of any type in 2018 compared to 2016 in all camps except in Umsangour. However, the overall ownership status was far below the expected as mass LLIN distribution was undertaken in December 2017. Probable reasons for this may either be as a result of refugees having sold these LLINs in order to take care of essential needs or due to under-declaration that could have been influenced by anticipation to receive an additional mosquito net.

Table 4.2. 20 : Average Number of LLIN and number of person per LLIN

	Average number of LLINs per household	Average number of persons per LLIN
Khor Alwaral	2.3	5.9
Um Sangour	1.3	21.5
Al Radis 1 & 2	2.6	2.6
El Kashafa	2.9	3.1
Jouri	2.5	3.2
Alagaya & Dabat Bosin	2.4	3.2

TABLE 3.1. 2: Mosquito net Utilization.

Table 4.2. 21: Proportion of HH that slept under net of any type

Camps	Proportion of total population (all ages)			Proportion of 0-59 months			Proportion of pregnant women		
	Total No=	n=	%	Total No=	n=	%	Total No=	n=	%
Khor Alwaral	861	249	28.9%	194	74	38.1%	19	6	31.6%
Um Sangour	775	97	12.5%	178	43	24.1%	31	1	3.2%
Al Radis 1 & 2	810	524	64.7%	191	156	81.8%	17	11	64.7%
El Kashafa	931	486	52.2%	214	146	68.2%	19	10	52.6%
Jouri	977	556	56.9%	233	163	70.0%	24	18	75.0%
Alagaya & Dabat Bosin	953	500	52.6%	241	170	56.5%	23	13	56.5%

Table 4.2. 22: Proportion of HH slept under LLIN

Camps	Proportion of total population (all ages)			Proportion of 0-59 months			Proportion of pregnant women		
	Total No=	n=	%	Total No=	n=	%	Total No=	n=	%
Khor Alwaral	861	194	22.5%	194	68	35.0%	19	6	31.6%
Um Sangour	775	78	10.1%	178	41	23.0%	31	1	3.2%
Al Radis 1 & 2	810	512	63.2%	191	152	79.6%	17	11	64.7%
El Kashafa	931	484	52.0%	214	146	68.2%	19	10	52.6%
Jouri	977	233	23.8%	233	163	70.0%	24	18	75.0%
Alagaya & Dabat Bosin	953	500	52.6%	241	170	56.5%	23	13	56.5%

As shown in table 4.2.22 above, utilisation of mosquito nets among total population is significantly low.

5   Discussion

4.1 Nutritional status of young children

The prevalence of acute malnutrition in Khor Alwaral, Um Sangour and Al Radis 1&2 camps was classified as being critical, with Global Acute Malnutrition (GAM) rate above the 15% of emergency threshold (WHO classification). The results were as follows: 19.4% (15.3-23.9 C.I) in Khor Alwaral, 16.1% (12.5-20.5 C.I) in Um Sangour, and 18.8% (14.9-23.4 C.I) in Al Radis 1&2 camps. Whereas, in El Kashafa, Jouri and Alagaya & Dabat Bosin camps were classified as being in the serious category (10-14% WHO classification). The results were as follows: 13.1% (9.9-17.1 C.I) in El Kashafa, 14.3% (11.0-18.4 C.I) in Jouri, and 13.6% (10.6-17.4 C.I) in Alagaya and Dabat Bosin. The prevalence of Severe Acute Malnutrition (SAM) ranged between 1.2% and 6.1% across the camps. The highest SAM prevalence was reported in Khor Alwaral 6.1% (4.0-9.1 C.I) and Jouri 3.7% (2.2-6.3 C.I), while the lowest was reported in El Kashafa 1.2% (0.5-3.0 C.I). Though statisically insignificant, improvements were observed in all camps compared to the 2016 SENS findings. Nevertheless, none of the camps achieved the UNHCR intended target for the prevalence of GAM rate among children 6-59 months of age < 10%. Similarly the prevalence of SAM rate in Khor Alwaral and Jouri camps remained above the UNHCR target for the prevalence of SAM rate <2%.

4.2 Morbidity

The survey collected morbidity data mainly on diarrhoea among children 6-59 month of age in the last two weeks prior to nutrition survey. Diarrhoea is closely linked to nutritional status of children. The result revealed a prevalence of diarrhoea in three camps i.e. Jouri 21.8% (17.8-26.4 C.I), Um Sangour 23.8% (19.5-28.7 C.I) and Al Radius 1&2 24.7% (20.3-29.7 C.I). This was however lower in other locations i.e. Khor Alwaral 12.7% (9.6-16.6 C.I), El Kashafa 12.5% (9.3-16.40 C.I) and Alagaya & Dabat Bosin 15.9% (12.6-19.8 C.I).

4.3 Programme coverage

The programme coverage for health indicators of children who were found to be malnourished during the time of survey and their enrolment status into the ongoing MAM and SAM nutrition programme was below the expected level: Target of > 90 % MAM and SAM coverages for the camp settings (Sphere and UNHCR SENS indicators). Enrolment coverage for acutely malnourished children in the nutrition programme (measured at a point in time), by MUAC alone and as well all criteria was far below the expected target (target >90%). Admission into the TSFP program ranged between 14.2% and 66.6%. The lowest was reported in Um Sangour 14.2% (1.7-42.8 C.I), while the highest was recorded in Alagaya & Dabat Bosin 66.6% (34.8-90.0 C.I). Enrolment coverage in the Therapeutic Feeding Program based on only Oedema and MUAC were lowest in Khor Alwaral 4.1% (48.9-87.3) and Um Sangour 20.0% (0.5-71.6). The highest was reported in El Kashafa 100.0%.

The programme coverage for health indicators (measles vaccination and vitamin A supplementation) for children (both by card and mother/care-giver confirmation) was relatively good. For measles vaccination, the lowest coverage was recorded at 86.2% (81.8-89.9 C.I) in Um Sangour and the highest coverage was recorded at 100.0% in El Kashafa. Likewise, for Vitamin A supplementation, the lowest coverage was at 74.9% (69.9-79.3 C.I) in Um Sangour and the highest was recorded at 100.0% in El Kashafa. The coverage of measles and vitamin A supplementation by card only was far below the UNHCR standard. The information from a card is the most reliable source of data to measure performance. It is worth noting that information from a card is the most reliable source of data to measure performance. Poor performance by card could be associated with irregular administration of cards from the health facility or due to poor retention of cards by the family. Nevertheless, the 2018 survey revealed some good progress compared to the 2016 survey.

Programme coverage for pregnant women who attended Antenatal Care (ANC) and also received Iron- folate pills was good in Al Radis 1&2, i.e. 90.0% (55.5-99.7 C.I). This was followed by Alagaya and Dabat Bosin 86.6% (59.5-98.3), Jouri 78.5% (49.2-95.3) and El Kashafa 70.5% (44.0-89.6 C.I). Whereas the lowest ANC coverage was reported in Um Sangour 25.0% (7.2-52.3 C.I) and Khor Alwaral 55.0% (31.5-76.9 C.I). Analysis did not reveal significant differences between ANC enrolment status and iron-folic acid pills distribution.

4.4 Anaemia in young children and women

The prevalence of Anaemia among children 6-59 months of age was categorized as critical (critical if ≥ 40%) in the following refugee camps: Alagaya & Dabat Bosin 44.8% (39.9-49.7 C.I), Khor Alwaral 46.8% (41.9-51.7 C.I) and Jouri 42.7 (37.7-48.1 C.I). In El Kashafa and Al Radis, anaemia prevalence was within the medium range of public health classification i.e. 38.3% (33.3-43.7 C.I) and 38.4% (33.3-43.8 C.I) respectively. In Um Sangour this was recorded at 23.0% (18.7-29.9 C.I). Anaemia prevalence among women of reproductive age (15-49 years) was highest in Alagaya & Dabat Bosin 40.8% (32.1-49.9 C.I), classified as being in the critical category. This was followed by Jouri 33.7% (26.7-41.3 C.I), Al Radis 28.1% (20.1-36.7 C.I) and Um Sangour 27.1% (18.5-37.1 C.I), classified as being in the medium category. El Kashafa registered a prevalence of 17.1 % (11.7-24.5 C.I), which is acceptable. UNHCR Strategy for Nutrition and Food Security targets <20% for the prevalence of Anaemia in children 6-59 months of age and in women 15-49 years of age.

4.5 IYCF indicators

Key indicators for Infant and Young Children Feeding practices (IYCF) revealed varied results across the camps. Timely initiation of breastfeeding among children 0-23 month of age ranged between 82.5% and 92.4%. Exclusive breastfeeding among children 0-5 month of age was low except in Jouri camp that registered 70.0% (34.7-93.3 C.I). In the other camps this ranged between 30.0% and 47.0%, whereby the lowest was recorded in Alagaya & Dabat Bosin 30.0% (6.6-65.2 C.I). The time of introduction of solid, semi-solid or soft foods for children 6-8 months old was poor in all locations ranging between 11.7% and 28.5%.

4.6 Food security

General food assistance which is provided on monthly-basis is the main source of household food security for the entire refugee community across the eight camps. However, the distribution plan encountered missing food commodities. In March 2018, refugees received Sorghum, salt and Vegetable oil (Vegetable oil was 37% of the monthly allocation and expected to cover about 11 days), whereas in February only Sorghum and salt were distributed. Over 99% of surveyed households had a ration card which may not however necessarily translate to food reaching the households and being utilized appropriately. This is due to the dynamics which include sale of ration to cover milling cost, to purchase other preferred food items and fulfil other needs. As the ration was not lasting the intended duration, and access to livelihood and food/cash income is limited, refugees tend to exercise various coping strategies. The survey result revealed that dependency on using negative coping strategies was high in all the camps (83.6 – 96.3% of refugees are using one or more of the negative coping strategies). As such, the number of people that were not using any of the potentially harmful coping strategies only ranged between 3.7% and 16.4%.

4.7 WASH

The proportion of households using an improved drinking water source reported in all the camps was 100.0%, however, the per capita water use/consumption was identified as a key gap. Across the camps proportion who were using ≥20lpppd (UNHCR target) ranged between 16.9 – 69.4%. Overall, those who used <15 littler per person per day ranged between 14.1% and 51.1%. The lowest percentage was reported in Jouri 14.1% (9.2-20.2 C.I), while the highest was recorded in Um Sangour 51.1% (42.4-59.7 C.I).

The coverage for family/family shared toilets was low in all camps. Communal latrines were widely used. Unsafe excreta disposal method is rather common (open defecation is common in almost all locations). As a result, use of unsafe excreta disposal ranges between 19.8% and 31.9%. The lowest was reported in Khor Alwaral 19.8% (13.3-27.70 C.I), while the highest was recorded in El Kashafa 31.9% (24.2-40.3 C.I). The exposure to diarrhoeal diseases is primarily associated with poor hygiene and sanitation practices in the community. Proportion of households with children under three years old that dispose of faeces safely ranged between 56.5% and 72.5%. The lowest was reported in Al Radis 1&2 56.5% (45.2-67.2 C.I), while the highest was recorded in Um Sangour 72.5% (62.1-81.3 C.I).

4.8 Mosquito net coverage

The proportion of households owning at least one mosquito net of any type ranged between 19.2% and 76.8%. This is below UNHCR's target >80%. The lowest was reported in Um Sangour 19.2% (13.0-26.6 C.I), while the highest was recorded in Al Radis 1&2 76.8% (69.2-83.2 C.I). Other camps performed as follows: Khor Alwaral 49.6% (40.6-58.5 C.I), Alagaya & Dabat Bosin 68.4% (60.875.3 C.I), El Kashafa 69.3% (61.2-76.5 C.I), and

Jouri 72.3% (64.9-78.7 C.I). The proportion of households owning at least one LLIN was below the UNHCR's target >80%. The lowest was reported in Um Sangour 15.6% (10.0-22.6 C.I), while the highest was recorded in Al Radis 1&2 75.5% (67.8-82.1). These findings are in contradiction with operational realities as mass distribution of LLIN was recently conducted in all the camps and host communities in December 2017. The most plausible reason for this is the likelihood for refugees having sold these LLINs in order to take care of other essential needs.

4.9 Mortality rate for the previous three months

The retrospective mortality rates for the last 90 days (three months) for crude mortality rate (CMR) and under five years old children mortality rate (U5MR) were within acceptable limits for an emergency context i.e. <1.0/10,000/day for CMR and <2.0/10,000/day for U5MR. CMR results ranged between 0.2 and 0.5/10,000/day, while U5MR ranged between 0.5 and 1.1/10,000/day.

6   Conclusion

Compared to the SENS 2016 relative improvement was observed in all locations, specifically Al Kashafa, Jouri, Alagaya and Dabat Bosin (kept within the serious category of nutritin status). However, with other aggravating factors the overall situation places white Nile camps in the critical category of nutrition situation. The current status of global acute malnutrition in White Nile camps indicates a fragile nutrition situation with possible further deterioration if not analyzed holistically and interventions put in place in the various sectors. The high diarrhoeal prevalence is associated with insufficient quantity of water and poor hygiene practices. Access to reliable and sustainable WASH services remains an important need for refugees across the camps. The ongoing food pipeline breaks and below standard food distribution and sale of the portion of food to fulfil unmet needs contributes towards food insecurity, which subsequently result in risk of malnutrition.

The relatively weak programme implementation, dependency on single tool for admission criteria (using only MUAC as admission criteria for SAM and MAM cases) into the ongoing nutrition program, loose referral linkages within the program (TSFP–OTP-SFP) and Blanket Supplementary programme, weak outreach interventions, nutritional and food resource sharing/dilutions at household level were among the observed gaps and issues of concern.   The survey findings call for an immediate and longer term solution to break the cycle of malnutrition across the camps.

7   Recommendations

Revisit the ongoing nutrition admission procedures (routine/active case finding and periodic MUAC screening) for the timely detection of malnutrition and maximize admission rate. (UNICEF, WFP and Nutrition partners).

Apply mixed admission criteria (MUAC and Weight-For-Height/WFH), check children at risk group (MUAC >12.5 cm and <13.5 cm) by WFH for secondary level screening to maximize opportunity to identify malnourished children during screening. (Nutrition partners/SRCS, MOH, MSF, GHF)

WFP should consider separating blanket supplementary feeding program (BSFP) from the monthly food ration distribution and link this with the nutrition program. The BSFP program should be used as an opportunity for timely detection of malnutrition, nutrition/health education etc. (WFP and Nutrition partners).

Minimize fragmentation of nutrition program in the camps and look for comprehensive approach, WFP and UNICEF to discuss and integrate the TFP and SFP program to ensure effective resource utilization and increased program quality.

UNICEF, UNHCR and partners to consider conducting Knowledge, Attitude and Practices (KAP) survey to assess the current knowledge, attitude and practices of communities regarding Infant and Young Children Feeding practices, WASH and behavioural changes of community awareness promotion.

Revisit the ongoing general food assistance modalities and devise a mechanism to compensate missing food commodity from the food basket, conduct feasibility study for the combined cash and an in-kind assistance arm to avoid irregularities of food assistance. (WFP, UNHCR and food security partners).

Look for alternative forms of assistance which leads towards food secured households. UNHCR, WFP and government counterparts to plan for detailed study on food security situation for refugees and apply target-based approach to minimize dependency on routine food assistance.

Maintain and strengthen the provision of comprehensive community based primary health care programme for refugee and host populations. (UNHCR, WHO, UNICEF, UNFPA, health and nutrition partners)

Develop a strategy for periodic de-worming (<5yrs age children and above/school age children) campaign for refugees and host population, at least two times in the year to curb the high morbidity caseload with intestinal worms. (UNHCR, WHO, MOH and health partners).

Establish what happened to the LLINs that were distributed in all camps during the mass distribution campaign in 2017, as LLIN coverage is currently lower than UNHCR's target >80%. Additionally, monitor proper usage of these LLINs. (UNHCR, WHO, MOH and health partners).

Establish a clear outreach strategy, context specific awareness promotion which includes a wider perspective (Health, Nutrition, WASH etc.) with a clear monitoring approach to ensure appropriate messages are delivered and reflected on behavioural changes. (Health and nutrition technical working group at National and state level).

UNHCR and partners to coordinate and conduct follow-up SENS survey to measure the implementation of recommendations and identify gaps so as to address accordingly.

Appendixe 1: SMART Plausibility Check (PC) Report

Plausibility check for: SUDWN_032018_SENS_SSR_KhorAlwaral camp.

Standard/Reference used for z-score calculation: WHO standards 2006

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 (0.6 %)

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     0 (p=0.998)

Dig pref score - weight  Incl  #     0-7   8-12     13-20    > 20
                                          0       2        4      10     0 (5)

Dig pref score - height  Incl  #     0-7   8-12     13-20    > 20
                                          0       2        4      10     2 (8)

Dig pref score - MUAC    Incl  #     0-7   8-12     13-20    > 20
                                          0       2        4      10     0 (7)

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     5 (1.10)

Skewness   WHZ          Excl   #     <±0.2 <±0.4    <±0.6    >=±0.6
                                          0       1        3       5     0 (-0.12)

Kurtosis   WHZ          Excl   #     <±0.2 <±0.4    <±0.6    >=±0.6
                                          0       1        3       5     0 (-0.11)

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        9 %
```

The overall score of this survey is 9 %, this is excellent.
There were no duplicate entries detected.
Percentage of children with no exact birthday: 60 %

Plausibility check for: SUDWN_042018_SENS_SS_Umsangur camp
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 (0.0 %)

Overall Sex ratio       Incl   p     >0.1  >0.05    >0.001  <=0.001
(Significant chi square)                  0       2        4      10     0 (p=0.867)

Age ratio(6-29 vs 30-59) Incl  p     >0.1  >0.05    >0.001  <=0.001
(Significant chi square)                  0       2        4      10     0 (p=0.532)

Dig pref score - weight  Incl  #     0-7   8-12     13-20    > 20
```

```
                                   0       2       4        10       0 (6)

Dig pref score - height  Incl  #   0-7    8-12   13-20    > 20
                                   0       2       4        10       2 (10)

Dig pref score - MUAC    Incl  #   0-7    8-12   13-20    > 20
                                   0       2       4        10       2 (8)

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 (1.04)

Skewness   WHZ           Excl  #   <±0.2  <±0.4  <±0.6    >=±0.6
                                   0       1      3         5        0 (0.05)

Kurtosis   WHZ           Excl  #   <±0.2  <±0.4  <±0.6    >=±0.6
                                   0       1      3         5        1 (-0.33)

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        5 %
```

The overall score of this survey is 5 %, this is excellent.
There were no duplicate entries detected.
Percentage of children with no exact birthday: 68 %

Plausibility check for: SUDWN_SENS_042018_SS_Radius 1 and 2.
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 (0.6 %)

Overall Sex ratio      Incl   p    >0.1  >0.05   >0.001   <=0.001
(Significant chi square)            0      2      4         10       0 (p=0.346)

Age ratio(6-29 vs 30-59) Incl p    >0.1  >0.05   >0.001   <=0.001
(Significant chi square)            0      2      4         10       0 (p=0.852)

Dig pref score - weight  Incl  #   0-7   8-12    13-20    > 20
                                   0      2      4         10       0 (5)

Dig pref score - height  Incl  #   0-7   8-12    13-20    > 20
                                   0      2      4         10       2 (10)

Dig pref score - MUAC    Incl  #   0-7   8-12    13-20    > 20
                                   0      2      4         10       2 (8)

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 (1.05)

Skewness   WHZ           Excl  #   <±0.2 <±0.4   <±0.6    >=±0.6
                                   0      1      3         5        1 (0.31)

Kurtosis   WHZ           Excl  #   <±0.2 <±0.4   <±0.6    >=±0.6
                                   0      1      3         5        0 (-0.13)

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        5 %
```
The overall score of this survey is 5 %, this is excellent.
There were no duplicate entries detected.
Percentage of children with no exact birthday: 23 %

Plausibility check for: SUDWN_SENS_032018_SS_Kashafa camp.
 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 (0.0 %)

Overall Sex ratio        Incl    p    >0.1  >0.05    >0.001   <=0.001
(Significant chi square)                0     2        4         10       0 (p=0.913)

Age ratio(6-29 vs 30-59) Incl    p    >0.1  >0.05    >0.001   <=0.001
(Significant chi square)                0     2        4         10       0 (p=0.774)

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       2 (8)

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 (1.01)

Skewness   WHZ           Excl    #    <±0.2 <±0.4    <±0.6    >=±0.6
                                        0     1        3         5        0 (0.19)

Kurtosis   WHZ           Excl    #    <±0.2 <±0.4    <±0.6    >=±0.6
                                        0     1        3         5        1 (0.29)

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       5 %
```

The overall score of this survey is 5 %, this is excellent.
There were no duplicate entries detected.
Percentage of children with no exact birthday: 31 %

Plausibility check for: SENSWN_042018_SENS_SS_Jouri camp.
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 (1.7 %)

Overall Sex ratio        Incl    p    >0.1  >0.05    >0.001   <=0.001
(Significant chi square)                0     2        4         10       0 (p=0.630)

Age ratio(6-29 vs 30-59) Incl    p    >0.1  >0.05    >0.001   <=0.001
(Significant chi square)                0     2        4         10       0 (p=0.315)

Dig pref score - weight  Incl    #    0-7   8-12     13-20     > 20
                                        0     2        4         10       0 (5)

Dig pref score - height  Incl    #    0-7   8-12     13-20     > 20
                                        0     2        4         10       2 (12)

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 (1.04)

Skewness  WHZ            Excl   #   <±0.2 <±0.4   <±0.6   >=±0.6
                                      0     1       3        5      0 (-0.04)

Kurtosis  WHZ            Excl   #   <±0.2 <±0.4   <±0.6   >=±0.6
                                      0     1       3        5      0 (0.09)

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     4 %
```

The overall score of this survey is 4 %, this is excellent.
There were no duplicate entries detected.
Percentage of children with no exact birthday: 32 %

Plausibility check for: SUDWN_042018_SENS_SS_AlegayaDB.
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 (0.0 %)

Overall Sex ratio       Incl   p   >0.1  >0.05   >0.001  <=0.001
(Significant chi square)              0     2       4       10      0 (p=0.801)

Age ratio(6-29 vs 30-59) Incl  p   >0.1  >0.05   >0.001  <=0.001
(Significant chi square)              0     2       4       10      0 (p=0.337)

Dig pref score - weight Incl   #   0-7   8-12    13-20    > 20
                                      0     2       4       10      0 (6)

Dig pref score - height Incl   #   0-7   8-12    13-20    > 20
                                      0     2       4       10      2 (11)

Dig pref score - MUAC   Incl   #   0-7   8-12    13-20    > 20
                                      0     2       4       10      2 (8)

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 (0.99)

Skewness  WHZ           Excl   #   <±0.2 <±0.4   <±0.6   >=±0.6
                                      0     1       3        5      1 (0.30)

Kurtosis  WHZ           Excl   #   <±0.2 <±0.4   <±0.6   >=±0.6
                                      0     1       3        5      0 (0.03)

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     5 %
```

The overall score of this survey is 5 %, this is excellent.
There were no duplicate entries detected.
Percentage of children with no exact birthday: 24 %

Appendix 2: Lists of survey participants

S/N	List of Enumerators	Organization
1	Hanan Abdulgadir Taha	MOA
2	Sana Albasher Abdalla	SRCS
3	Alafiah Kabashi	SMOH
4	Hatim Gamaleddin	SMOH
5	Hassan Omar Dawelbeit	SRCS
6	Alsadig Sheakh Eldeen	SRCS
7	Abdulrahman Yagoub Naeem	MOA
8	Nawal Alamin Korba	SRCS
9	Soha Omer Yousif	SRCS
10	Hana Bashir Ali	SRCS
11	Safaa Ibrahim Abdallah	MOA
12	Fathelrahman Eltayeb Mohammed	SMOH
13	Mona Abu Baker adam	MOA
14	Mohammed Eltigani Mohammed	SRCS
15	Magbola Mohammed Ahmed	SMOH
16	Siham Elhadi Mohammed	SMOH
17	Sara Eddouma	SMOH
18	Um Gumaa Ismail	SMOH
19	Mawada Mohamed	SMOH
20	Mahanna Eissa Gibril	SRCS
21	Mohammed Geiballah	SRCS
22	Mustafa Ismail Ahmed	SRCS
23	Mohammed Osman Tia	SRCS
24	Suleiman Hassan Elnour	SRCS
25	Salha Ali Abdelrahman	SRCS
26	Amira Elhadi Ahmed	SRCS
27	Hanan BAbeker Abdallah	SRCS
28	Hadia Abu Abdallah	SRCS
29	Siddig Ahmed Hamid	SRCS
30	Nasrin Mohammed Hamid	SMOH

S/N	Lists of survey coordinators, supervisors and team leader	Organization
1	Samuel Taddesse	UNHCR
2	Wisam Winila	UNHCR
3	Fatima Abdallah	SMOH/Nutrition
4	Abdallah Karrar	SMOH/Nutrition
5	Elsir Siddig Albasher	SMOH/EHA
6	Sara Albashr	SRCS
7	Adil Ibrahim	SRCS
8	Gamar Musa Kodi	UNICEF
9	Azza Anwar	UNICEF
10	Mohamed Mahjoub	WFP
11	Wedad Bashir Mohammed	GHF
12	Abeer Salah	GHF
13	Adil Ibrahim	SRCS
14	Khalid Sarour Mostafa	WHO
15	Elnaeim Abbas	WHO
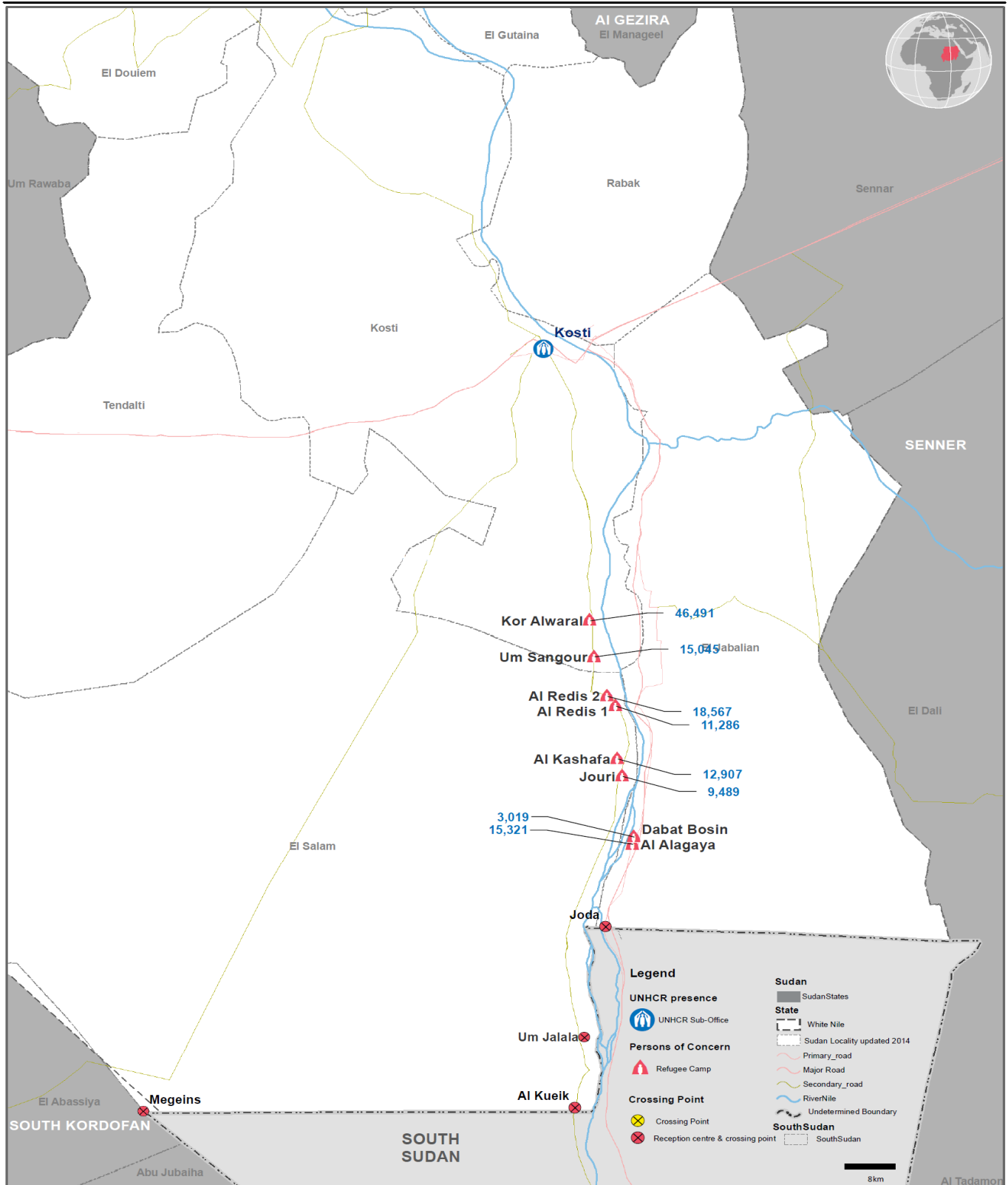
Note: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations. (Source: UNHCR, COR, HAC and SRCS)

Appendix 4: Local calnedar

Seasons: الفصول	Religious Holidays الاعياد الدينية	Local Event (in camp of surrounding villages): الاحداث المحلية في المعسكر	Month / year شهر \ السنة	Age (m) العمر بالشهر	Height Range المدي الطولي
Beginning of Hot: بداية الصيف			Mar-18 : مارس	0	
End of Cold: نهاية الشتاء			Feb-18 :فبراير	1	
Middle of cold: وسط الخر الشتاء	**New year** السنة الجديدة		Jan-18 :يناير	2	
Middle of cold: وسط الخر الشتاء	**Christmas** عيد كريسماس		Dec-17 :ديسمبر	3	
Beginning of Cold: بداية الشتاء			Nov-17 :نوفمبر	4	
End of Rain: نهاية الخريف			Oct-17 :اكتوير	5	
Middle of Rain: وسط الخريف			Sept-17 :سبتمبر	6	سم 65-70
Middle of Rain: وسط الخريف			Aug-17 : أغسطس	7	
Middle of Rain: وسط الخريف		South Sudan Independent day: انفصال جنوب السودان	Jul-17 :يوليو	8	
Beginning of Rain : بداية الخريف		June 20 Refugee day: 20 يونيو يوم اللاجئ العالمي	Jun-17 :يونيو	9	
End of Hot: نهاية الصيف			May-17 :مايو	10	
Middle of Hot: وسط الصيف			Apr-17 : ابريل	11	سم 71-76
Beginning of Hot: بداية الصيف			Mar-17 : مارس	12	
End of Cold: نهاية الشتاء			Feb-17 :فبراير	13	
Middle of cold: وسط الخر الشتاء	**New year** السنة الجديدة		Jan-17 :يناير	14	
Middle of cold: وسط الخر الشتاء	**Christmas** عيد كريسماس		Dec-16 : ديسمبر	15	
Beginning of Cold: بداية الشتاء			Nov-16 :نوفمبر	16	
End of Rain: نهاية الخريف			Oct-16 : أكتوير	17	سم 77-80
Middle of Rain: وسط الخريف			Sept-16 : سبتمبر	18	
Middle of Rain: وسط الخريف			Aug-16 : أغسطس	19	
Middle of Rain: وسط الخريف		South Sudan Independent day انفصال جنوب السودان	Jul-16 :يوليو	20	
Beginning of Rain: بداية الخريف		June 20 Refugee day: 20 يونيو يوم اللاجئ العالمي	Jun-16 :يونيو	21	
End of Hot: نهاية الصيف			May-16 :مايو	22	
Middle of Hot: وسط الصيف			Apri-16 : أبريل	23	سم 81-86
Beginning of Hot: بداية الصيف			Mar-16 : مارس	24	
End of Cold: نهاية الشتاء			Feb-16 :فبراير	25	
Middle of cold: وسط الخر الشتاء	**New year** السنة الجديدة		Jan-16 :يناير	26	
Middle of cold: وسط الخر الشتاء	**Christmas** عيد كريسماس		Dec-15 :ديسمب	27	
Beginning of Cold: بداية الشتاء			Nov-15 :نوفمبر	28	
End of Rain: نهاية الخريف			Oct- 15 :أكتوير	29	
Middle of Rain: وسط الخريف			Sep- 15 : سبتمبر	30	
Middle of Rain: وسط الخريف			Aug- 15 :أغسطس	31	
Middle of Rain: وسط الخريف		South Sudan Independent day انفصال جنوب السودان	Jul-15 :يوليو	32	سم 87-90
Beginning of Rain: بداية الخريف		June 20 Refugee day: 20 يونيو يوم اللاجئ العالمي	June-15 :يونيو	33	
End of Hot: نهاية الصيف	**Refugee day** يوم اللاجئ		May-15 :مايو	34	
Middle of Hot: وسط الصيف			April-15 :أبريل	35	
Beginning of Hot: بداية الصيف			Mar-15 :مارس	36	
End of Cold: نهاية الشتاء			Feb-15 :فبراير	37	
Middle of cold: وسط الخر الشتاء	**New year** السنة الجديدة		Jan-15 :يناير	38	
Middle of cold: وسط الخر الشتاء	**Christmas** كريسماس عيد		Dec-14 :ديسمبر	39	
Beginning of Cold: بداية الشتاء			Nov-14 :نوفمبر	40	
End of Rain: نهاية الخريف			Oct-14 :أكتوير	41	
Middle of Rain: وسط الخريف			Sept-14 :سبتمبر	42	
Middle of Rain: وسط الخريف			Aug-14 :أغسطس	43	
Middle of Rain: وسط الخريف		South Sudan Independent day: انفصال جنوب السودان	July-14 :يوليو	44	سم 91-99
Beginning of Rain: بداية الخريف		June 20 Refugee day: 20 يونيو يوم اللاجئ العالمي	June-14 :يونيو	45	
End of Hot: نهاية الصيف			May-14 :مايو	46	
Middle of Hot: وسط الصيف			Apr-14 :أبريل	47	
Beginning of Hot: بداية الصيف			Mar-14 :مارس	48	
End of Cold: نهاية الشتاء			Feb-14 :فبراير	49	
Middle of cold: وسط الخر الشتاء	**New year** السنة الجديدة		Jan-14 :يناير	50	
Middle of cold: وسط الخر الشتاء	**Christmas** عيد كريسماس		Dec-13 :ديسمبر	51	
Beginning of Cold: بداية الشتاء			Nov-13 : نوفمبر	52	
End of Rain: نهاية الخريف			Oct-13 :أكتوير	53	
Middle of Rain: وسط الخريف			Sept-13 :سبتمبر	54	سم 100-110
Middle of Rain: وسط الخريف			Aug-13 :أغسطس	55	
Middle of Rain: وسط الخريف		South Sudan Independent day: انفصال جنوب السودان	July-13 :يوليو	56	
Beginning of Rain: بداية الخريف		June 20 Refugee day: 20 يونيو يوم اللاجئ العالمي	June-13 :يونيو	57	
End of Hot: نهاية الصيف			May-13 :مايو	58	
Middle of Hot: وسط الصيف			Apr-13 :أبريل	59	

Appendix 5: SENS questionnaire

UNHCR Standardised Expanded Nutrition Survey (SENS) Questionnaire

Verbal Conscent taking guide

Greeting and reading of rights:

This statement is to be read to the head of the household or, if they are absent, another adult member of the house before the interview. Define head of household as member of the family who manages the family resources and is the final decision maker in the house.

Hello, my name is _____ and I work with *[organisation/institution]*. We would like to invite your household to participate in a survey that is looking at the nutrition and health status of people living in this camp.

- UNHCR is sponsoring this nutrition survey.
- Taking part in this survey is totally your choice. You can decide to not participate, or if you do participate you can stop taking part in this survey at any time for any reason. If you stop being in this survey, it will not have any negative effects on how you or your household is treated or what assistance you receive.
- If you agree to participate, I will ask you some questions about your family and I will also measure the weight and height of all the children in the household who are older than 6 months and younger than 5 years In addition to these assessments, I will test a small amount of blood from the finger of the children and women to see if they have anaemia.
- Before we start to ask you any questions or take any measurements, we will ask you to give us your verbal consent. Be assured that any information that you will provide will be kept strictly confidential.
- You can ask me any question that you have about this survey before you decide to participate or not.
- If you do not understand the information or if your questions were not answered to your satisfaction, do not declare your consent on this form. Thank you.

Note that in some camps, the words 'block' and 'section' may not be used and other words may be used for these. Adapt the wording accordingly.

CAPITAL LETTERS refer to instructions for the surveyors and should not be read to the respondent.

CHILDREN 6-59 MONTHS ANTHROPOMETRY, HEALTH AND ANAEMIA: 1 questionnaire per cluster / zones / sections *(This questionnaire is to be administered to all childREN between 6 and 59 months of age)*

Section code / number:_____**Block code / number**: _____

Date of interview (dd/mm/yyyy): |__|__|/|__|__|/|__|__||__|__|					Cluster Number (*in cluster survey only*) |__|__|					Team number |__|		

CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8	CH9	CH10	CH11	CH12	CH13	CH14	CH15
ID	HH	Consent given 1=Yes 2=No 3=Absent	Sex (m/f)	Birthdate* dd/mm/yyyy	Age** (months)	Weight (kg) ±100g	Height (cm) ±0.1cm	Oedema (y/n)	MUAC (mm)	Child enrolled 1=SFP 2=TFP 3=None	Measles 1=Yes card 2=Yes recall 3=No or don't know	Vit. A in past 6 months (SHOW CAPSULE) 1=Yes card 2=Yes recall 3=No or don't know	Diarrhoea in past 2 weeks 1=Yes 2=No 3=Don't know	Hb *(g/L or g/dL)*
01				/ /										
02				/ /										
03				/ /										
04				/ /										
05				/ /										
06				/ /										
07				/ /										
08				/ /										
…				/ /										

*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.

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)

Section code / number:_____**Block code / number**: _____

Date of interview (dd/mm/yyyy):				Cluster Number (*in cluster survey only*)		Team number	
|___|___|/|___|___|/|___|___||___|___|				|___|___|		|___|	
WM1	**WM2**	**WM3**	**WM4**	**WM5**	**WM6**	**WM7**	**WM8**
ID	HH	Consent given 1=Yes 2=No 3=Absent	Age (years)	Are you pregnant? 1=Yes 2=No (GO TO HB) 8=Don't know (GO TO HB)	Are you currently <u>enrolled</u> in the ANC programme? 1=Yes 2=No 8=Don't know	Are you currently <u>receiving</u> iron-folate pills (*SHOW PILL*)? 1=Yes (STOP NOW) 2=No (STOP NOW) 8=Don't know (STOP NOW)	Hb (g/L or g/dL)
01							
02							
03							
04							
05							
08							
09							
10							

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)*

Section code / number:_____ **Block code / number**: _____ **Consent** : yes / no / absent

Date of interview (dd/mm/yyyy)	Cluster Number (*in cluster survey only*)	
|___|___|/|___|___|/|___|___||___|___|	|___|___|	
Team Number	**ID Number**	**HH Number**
|___|	|___|___|___|	|___|___|___|

No	QUESTION	ANSWER CODES	
SECTION IF1			
IF1	Sex	Male 1 Female 2	|___|
IF2	Birthdate RECORD FROM AGE DOCUMENTATION. LEAVE BLANK IF NO VALID AGE DOCUMENTATION.	Day/Month/Year…..|___|___| /|___|___| / |___|___||___|___|	
IF3	Child's age in 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?	Yes 1 No 2 Don't know 8	|___| **IF ANSWER IS 2 or 8 GO TO IF7**
IF5	How long after birth did you first put [NAME] to the breast?	Less than one hour 1 Between 1 and 23 hours 2 More than 24 hours 3 Don't know 8	|___|
IF6	Was [NAME] breastfed yesterday during the day or at night?	Yes 1 No 2 Don't know 8	|___|
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? ASK ABOUT EVERY LIQUID. IF ITEM WAS GIVEN, CIRCLE '1'. IF ITEM WAS NOT GIVEN, CIRCLE '2'. IF CAREGIVER DOES NOT KNOW, CIRCLE '8'. EVERY LINE MUST HAVE A CODE. Replace and adapt the TEXT HIGHLIGHTED IN GREY TO THE CONTEXT. The text IN *ITALICS* NEEDS TO BE DELETED FROM THE FINAL SURVEY QUESTIONNAIRE – THE LIST THAT IS PROVIDED BELOW IS AN EXAMPLE. Yes No DK		
	7A. Plain water		

		7A...........................1 2 8
7B. Infant formula, for example [INSERT locally available brand names of infant formula, *ALL TYPES*]	7B...........................1 2 8	
7C. Milk such as tinned, powdered, or fresh animal milk, for example [INSERT locally available brand names of tinned and powdered milk]	7C...........................1 2 8	
7D. Juice or juice drinks, for example [insert locally available brand names of juice drinks]	7D...........................1 2 8	
7E. Clear broth	7E...........................1 2 8	
7F. Sour milk or yogurt, for example [insert local names]	7F...........................1 2 8	
7G. Thin porridge, for example [insert local names]	7G...........................1 2 8	
7H. Tea or coffee with milk	7H...........................1 2 8	
7I. Any other water-based liquids, for example [insert other water-based liquids available in the local setting AND USE LOCAL NAMES] (e.g. *sodas, other sweet drinks, herbal infusion, gripe water, clear tea with no milk, black coffee, ritual fluids*)	7I.............................1 2 8	

IF8	Yesterday, during the day or at night, did [NAME] eat solid or semi-solid (soft, mushy) food?	Yes.....................1 No.......................2 Don't know........8	|___|

SECTION IF3

IF9	Did [NAME] drink anything from a bottle with a nipple yesterday during the day or at night?	Yes.....................1 No.......................2 Don't know........8	|___|

SECTION IF4

IF10	IS CHILD AGED 6-23 MONTHS? REFER TO IF2 / IF3	Yes.....................1 No......................2	|___| **IF ANSWER IS 2 STOP NOW**
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? ASK ABOUT EVERY ITEM. IF ITEM WAS GIVEN, CIRCLE '1'. IF ITEM WAS NOT GIVEN, CIRCLE '2'. IF CAREGIVER DOES NOT KNOW, CIRCLE '8'. EVERY LINE MUST HAVE A CODE. Replace and adapt the TEXT HIGHLIGHTED IN GREY TO THE CONTEXT. The text IN *ITALICS* NEEDS TO BE DELETED FROM THE FINAL SURVEY QUESTIONNAIRE – THE LIST THAT IS PROVIDED BELOW IS AN EXAMPLE. If a category of IRON-RICH food (11A-11H) is not available in the setting, delete it from the questionnaire BUT KEEP THE original QUESTION NUMBERS and do not change. Yes No DK		
	11A. [insert common meat, fish, poultry and liver/organ flesh foods used the local setting] (*e.g. beef, goat, lamb, mutton, pork, rabbit, chicken, duck, liver, kidney, heart*)	11A..1 2 8	
	11B. [INSERT FBF available in the local setting and USE LOCAL NAMES] (e.g. CSB+, WSB+)		

	11B……………………………………1	2 8
11C. [INSERT FBF++ available in the local setting AND USE LOCAL NAMES] *(e.g. CSB++, WSB++)*	11C……………………………………1	2 8
11D. [INSERT RUTF products available in the local setting AND USE LOCAL NAMES] *(e.g. Plumpy'Nut®, eeZeePaste™)* (SHOW SACHET)	11D……………………………………1	2 8
11E. [INSERT RUSF products available in the local setting AND USE LOCAL NAMES] *(e.g. Plumpy'Sup®)* (SHOW SACHET)	11E……………………………………1	2 8
11F. [INSERT LNS products available in the local setting AND USE LOCAL NAMES] *(e.g. Nutributter®, Plumpy'doz®)* (SHOW SACHET / POT)	11F……………………………………1	2 8
11G. [INSERT locally available brand names of *iron fortified* infant formula *ONLY*] *(e.g. Nan, S26 infant formula)*	11G…..………………………………1	2 8
11H. [iNSERTst any *iron fortified* solid, semi-solid or soft foods designed specifically for infants and young children available in the local setting that are different than distributed commodities AND USE LOCALLY AVAILABLE BRAND NAMES] *(e.g. Cerelac, Weetabix)*	11H……………………………....1	2 8
IF12	**In a setting where micronutrient powders are used:** Yesterday, during the day or at night, did [NAME] consume any food to which you added a [INSERT LOCAL NAME FOR Micronutrient powder or sprinkles] like this? (SHOW MICRONUTRIENT POWDER SACHET)	Yes……………………………1 No……………………………2 Don't know………………8	|___|

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)

Section code / number:_____**Block code / number**: _____**Consent** : yes / no / absent

Date of interview (dd/mm/yyyy)	Cluster Number (*in cluster survey only*)
|___|___|/|___|___|/|___|___||___|___|	|___|___|
Team Number	**HH Number**
|___|	|___|___|___|

No	QUESTION	ANSWER CODES
SECTION WS1		
WS1	How many people live in this household and slept here last night?	|___|___|

WS2	What is the **main** source of drinking water for members of your household? Adapt list to local setting before survey. When adapting the list, keep the original answer codes and do not change. DO NOT READ THE ANSWERS SELECT ONE ONLY	Piped water 01 Public tap/standpipe 02 Tubewell/borehole (& pump) 03 Protected dug well 04 Protected spring 05 Rain water collection 06 UNHCR Tanker 07 Unprotected spring 08 Unprotected dug well 09 Small water vendor 10 Tanker truck 11 Bottled water 12 Surface water (e.g. river, pond) 13 Other 96 Don't know 98	|___|___|
WS3	Are you satisfied with the water supply? THIS RELATES TO THE DRINKING WATER SUPPLY	Yes 1 No 2 Partially 3 Don't know 8	|___| **IF ANSWER IS 1, 3 OR 8 GO TO WS5**
WS4	What is the **main** reason you are not satisfied with the water supply? Adapt list to local setting before survey. DO NOT READ THE ANSWERS SELECT ONE ONLY	Not enough 01 Long waiting queue 02 Long distance 03 Irregular supply 04 Bad taste 05 Water too warm 06 Bad quality 07 Have to pay 08 Other 96 Don't know 98	|___|___|
WS5	What kind of toilet facility does this household use? Adapt list to local setting before survey. When adapting the list, keep the original answer codes and do not change. DO NOT READ THE ANSWERS SELECT ONE ONLY	Flush to piped sewer system 01 Flush to septic system 02 Pour-flush to pit 03 VIP/simple pit latrine with floor/slab 04 Composting/dry latrine 05 Flush or pour-flush elsewhere 06 Pit latrine without floor/slab 07 Service or bucket latrine 08 Hanging toilet/latrine 09 No facility, field, bush, plastic bag 10	|___|___| **IF ANSWER IS 10 GO TO WS7**
WS6	How many **households** share this toilet? THIS INCLUDES THE SURVEYED HOUSEHOLD	RECORD NUMBER OF HOUSEHOLDS IF KNOWN (RECORD 96 IF PUBLIC TOILET OR 98 IF UNKNOWN) **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	|___|___| Households |___|
WS7	Do you have children under three years old?	Yes 1 No 2	|___| **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?	Child used toilet/latrine 01 Put/rinsed into toilet or latrine 02	

| | DO NOT READ THE ANSWERS

SELECT ONE ONLY | Buried 03
Thrown into garbage 04
Put/rinsed into drain or ditch 05
Left in the open 06
Other 96
Don't know 98 | |___|___| |

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 ASSIGN A NUMBER TO EACH CONTAINER	Capacity in litres	Number of journeys made with each container	Total litres **SUPERVISOR TO COMPLETE HAND CALCULATION**
		1 E.g. jerry can	25 L	1 x	25
		2 E.g. jerry can	10 L	2 x	20
		3 E.g. jerry can	5 L	2 x	10
		4 E.g. jerry can	5 L	1 x	5
		5 E.g. bucket	50 L	1 x	50
		6			
		7			
		8			
		9			
		10			
		Total litres used by household			110
WS10	Please show me where you store your drinking water. ARE THE DRINKING WATER CONTAINERS COVERED OR NARROW NECKED?	All are 1 Some are 2 None are 3			|___|

FOOD SECURITY: 1 questionnaire per household *(*This questionnaire is to be administered to the Main Caretaker WHO IS RESPONSIBLE FOR COOKING THE MEALS)

Section code / number:_____**Block code / number**: _____**Consent** : yes / no / absent

Date of interview (dd/mm/yyyy)	Cluster Number (*in cluster survey only*)
|___|___|/|___|___|/|___|___||___|___|	|___|___|
Team Number	**HH Number**
|___|	|___|___|___|

No	QUESTION	ANSWER CODES	
SECTION FS1			
FS1	Does your household have a ration card?	Yes 1 No 2	|___| **IF ANSWER IS 1 GO TO FS3**
FS2	Why do you not have a ration card?	Not given one at registration 1 Lost card 2 Traded/sold card 3 Not registered but eligible 4 Not eligible (not in targeting criteria) 5 Other 6	|___| **GO TO FS5**
FS3	Does your household receive full or reduced ration? (OPTIONAL)	Full…………………………………………1 Half…………………………………………2 Other………………………………………6	|___| **IF ANSWER IS 2 OR 6 GO TO FS5**
FS4	How many days did the food from the general food aid ration from the [INSERT] cycle of [INSERT MONTH] last?	RECORD THE NUMBER OF DAYS IF KNOWN (RECORD 98 IF UNKNOWN)	|___|___|
FS5	In the last month, have you or anyone in your household borrowed cash, food or other items with or without interest?	Yes 1 No 2 Don't know 8	|___|
FS6	In the last month, have you or anyone in your household sold any assets that you would not have normally sold (furniture, seed stocks, tools, other NFI, livestock etc.)?	Yes 1 No 2 Don't know 8	|___|
FS7	In the last month, have you or anyone in your household requested increased remittances or gifts as compared to normal?	Yes 1 No 2 Don't know 8	|___|
FS8	In the last month, have you or anyone in your household reduced the quantity and / or frequency of meals and snacks?	Yes 1 No 2 Don't know 8	|___|
FS9	In the last month, have you or anyone in your household begged?	Yes 1 No 2 Don't know 8	|___|
FS10	In the last month, have you or anyone in your household engaged in: [Add list of potentially risky or harmful activities such as local illegal activities] or any other risky or harmful activities?	Yes 1 No 2 Don't know 8	|___|
SECTION FS2			
FS11	Now I would like to ask you about the types of foods that you or anyone else in your household ate yesterday during the day and at night. I am interested in whether you or anyone else in your household had the item even if it was combined with other foods. I am interested in knowing about meals, beverages and snacks eaten or drank inside or outside the home. READ THE LIST OF FOODS AND DO NOT PROBE. PLACE A *ONE* IN THE BOX IF ANYONE IN THE HOUSEHOLD ATE THE FOOD IN QUESTION, PLACE A *ZERO* IN THE BOX IF NO ONE IN THE HOUSEHOLD ATE THE FOOD. Replace and adapt the TEXT HIGHLIGHTED IN GREY TO THE CONTEXT. The text IN *ITALICS* NEEDS TO BE DELETED FROM THE final survey questionnaire – thE LIST THAT IS PROVIDED BELOW IS AN EXAMPLE.		

	1. Any [INSERT CEREALS LOCALLY AVAILABLE] (*e.g. wheat, corn/maize, corn soy blend, barley, buckwheat, millet, oats, rice, rye, sorghum, teff*) or any foods made from these such as [INSERT LOCAL FOODS] (*e.g. bread, porridge, noodles, ugali, nshima, paste*)	1…………………………|___|
	2. Any [INSERT WHITE ROOTS AND TUBERS LOCALLY AVAILABLE] (*e.g. green bananas, lotus root, parsnip, taro, plantains, white potatoes, white yam, white cassava, white sweet potato*) or any foods made from roots such as [INSERT LOCAL FOODS]	2…………………………|___|
	3A. Any [INSERT vitamin A rich vegetables and tubers locally available] (*e.g. carrot, pumpkin, squash, or sweet potato that are orange inside, red sweet pepper*)	3A…………………………|___|
	3B. Any [INSERT DARK GREEN LEAFY VEGETABLES locally available INLCUDING WILD FORMS AND VITAMIN A RICH LEAVES] (*e.g. amaranth, arugula, cassava leaves, kale, spinach*)	3B…………………………|___|
	3C. Any [INSERT ANY OTHER VEGETABLES locally available] (*e.g. bamboo shoots, cabbage, green pepper, tomato, onion, eggplant, zucchini*)	3C…………………………|___|
	4A. Any [INSERT VITAMIN A RICH FRUITS locally available], and 100% fruit juice made from these (*e.g. mango (ripe, fresh and dried), cantaloupe melon (ripe), apricot (fresh or dried), ripe papaya, passion fruit (ripe), dried peach*)	4A…………………………|___|
	4B. Any [INSERT any other fruits locally available INCLUDING WILD FRUITS], and 100% fruit juice made from these (*e.g. apple, avocados, banana, coconut flesh, lemon, orange*)	4B…………………………|___|
	5A. Any [INSERT ORGAN MEAT or blood-based foods Locally available] (*e.g. liver, kidney, heart*)	5A…………………………|___|
	5B. Any [INSERT FLESH MEAT LOCALLY AVAILABLE] (*e.g. beef, goat, lamb, mutton, pork, rabbit, chicken, duck, cane rat, guinea pig, rat, agouti frogs, snakes, insects*)	5B…………………………|___|
	6. Any eggs from [INSERT EGGS LOCALLY AVAILABLE] (*e.g. eggs from chicken, duck, guinea fowl*)	6…………………………|___|
	7. Any [INSERT FRESH, DRIED OR CANNED FISH OR SHELLFISH LOCALLY AVAILABLE] (*e.g. anchovies, tuna, sardines, shark, whale, roe/fish eggs, clam, crab, lobster, crayfish, mussels, shrimp, octopus, squid, sea snails*)	7…………………………|___|
	8. Any [INSERT LEGUMES, NUTS AND SEEDS LOCALLY AVAILABLE] (*e.g. dried peas, dried beans, lentils, nuts, seeds*) or any foods made from these such as [INSERT LOCAL FOODS] (*e.g. hummus, peanut butter*)	8…………………………|___|
	9. Any [INSERT MILK AND MILK PRODUCTS LOCALLY AVAILABLE] (*e.g. milk, infant formula, cheese, kiefer, yogurt*)	9…………………………|___|
	10. Any [INSERT OILS AND FATS LOCALLY AVAILABLE] added to food or used for cooking (*e.g. vegetable oil, ghee or butter*)	10…………………………|___|
	11. Any [INSERT SWEETS, SWEETENED SODA OR JUICE DRINKS AND SUGARY FOODS LOCALLY AVAILABLE] (*e.g. sugar, honey, soda drinks, chocolates, candies, cookies, sweet biscuits and cakes*)	11…………………………|___|
	12. Any [INSERT SPICES, CONDIMENTS AND BEVERAGES LOCALLY AVAILABLE] (*e.g. black pepper, salt, chillies, soy sauce, hot sauce, fish powder, fish sauce, ginger, herbs, magi cubes, ketchup, mustard, coffee, tea, beer, alcoholic beverages like wine, hard spirits*)	12…………………………|___|

MOSQUITO NET COVERAGE: 1 questionnaire per household (This questionnaire is to be administered to the head of the household or, if they are absent, and ANOTHER adult member of the household).

Section code / number:_____ **Block code / number**: _____ **Consent** : yes / no / absent

Date of interview (dd/mm/yyyy)	Cluster Number (*in cluster survey only*)
|___|___|/|___|___|/|___|___||___|___|	|___|___|
Team Number	**HH Number**
|___|	|___|___|___|

No	QUESTION	ANSWER CODES			
SECTION TN1					
TN1	How many people live in this household and slept here last night? INSERT NUMBER				|___|___|
TN2	How many children 0-59 months live in this household and slept here last night? INSERT NUMBER				|___|___|
TN3	How many pregnant women live in this household and slept here last night? INSERT NUMBER				|___|___|
TN4	Did you have your house sprayed with insecticide in an indoor residual spray campaign in the past |___| months? (OPTIONAL)	Yes 1 No 2			|___|
TN5	Do you have mosquito nets in this household that can be used while sleeping?	Yes 1 No 2			|___| **IF ANSWER IS 2 STOP NOW**
TN6	How many of these mosquito nets that can be used while sleeping does your household have? INSERT NUMBER	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
TN7	ASK RESPONDENT TO SHOW YOU THE NET(S) IN THE HOUSEHOLD. IF NETS ARE NOT OBSERVED → CORRECT TN6 ANSWER	NET #|___|	NET #|___|	NET #|___|	NET #|___|
TN8	OBSERVE NET AND RECORD THE BRANDNAME OF NET ON THE TAG. IF NO TAG EXISTS OR IS UNREADABLE RECORD 'DK' FOR DON'T KNOW.				
TN9	**For surveyor/supervisor only (not to be done during interview):** WHAT TYPE OF NET IS THIS? BASED ON THE TAG INDICATE IF THIS IS A LLIN OR OTHER TYPE OF NET OR DK.	1=LLIN 2=Other/DK |___|	1=LLIN 2=Other/DK |___|	1=LLIN 2=Other/DK |___|	1=LLIN 2=Other/DK |___|
TN10	**For surveyor/supervisor only (not to be done during interview):** RECORD THE TOTAL NUMBER OF LLINs IN HOUSEHOLD BY COUNTING THE NUMBER OF '1' IN TN9.				|___| LLINs

SECTION TN2							
Line no	**Household members**	**Sex**	**Age**	**Pregnancy status**	**Slept under net**	**Which net**	**Type of net**
#	**COL1**	**COL2**	**COL3**	**COL4**	**COL5**	**COL6**	**COL7**
	Please give me the names of the household 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 OR N/A '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. WRITE THE NUMBER CORRESPONDING TO THE NET THEY USED.	**For surveyor/ supervisor only:** Based on the observed net brandname recorded (TN8), indicate if it is an LliN or other / don't know (DK). LLIN OTHER/DK
01		m f	<5 ≥5	1 0 99	1 0	|___|	1 2
02		m f	<5 ≥5	1 0 99	1 0	|___|	1 2
03		m f	<5 ≥5	1 0 99	1 0	|___|	1 2
04		m f	<5 ≥5	1 0 99	1 0	|___|	1 2
05		m f	<5 ≥5	1 0 99	1 0	|___|	1 2
06		m f	<5 ≥5	1 0 99	1 0	|___|	1 2

Mosquito net summary (for surveyor / supervisor only, not to be done during interview)

	Total household members		Total <5		Total Pregnant	
Slept under a net of any type	Count the number of '1' in COL5	**TN11** |___|___|	For children < 5 (COL3 is '<5'), count the number of '1' in COL5	**TN13** |___|___|	For pregnant women (COL4 is '1'), count the number of '1' in COL5	**TN15** |___|___|
Slept under an LLIN	Count the number of '1' in COL7	**TN12** |___|___|	For children <5 (COL3 is '<5'), count the number of '1' in COL7	**TN14** |___|___|	For pregnant women (COL4 is '1'), count the number of '1' in COL7	**TN16** |___|___|