SENS NUTRITION SURVEY REPORT

Sudanese, Eritrean, Ethiopian, Somali and Iraqi refugees in Egypt

Survey conducted: 16th -26th December 2015

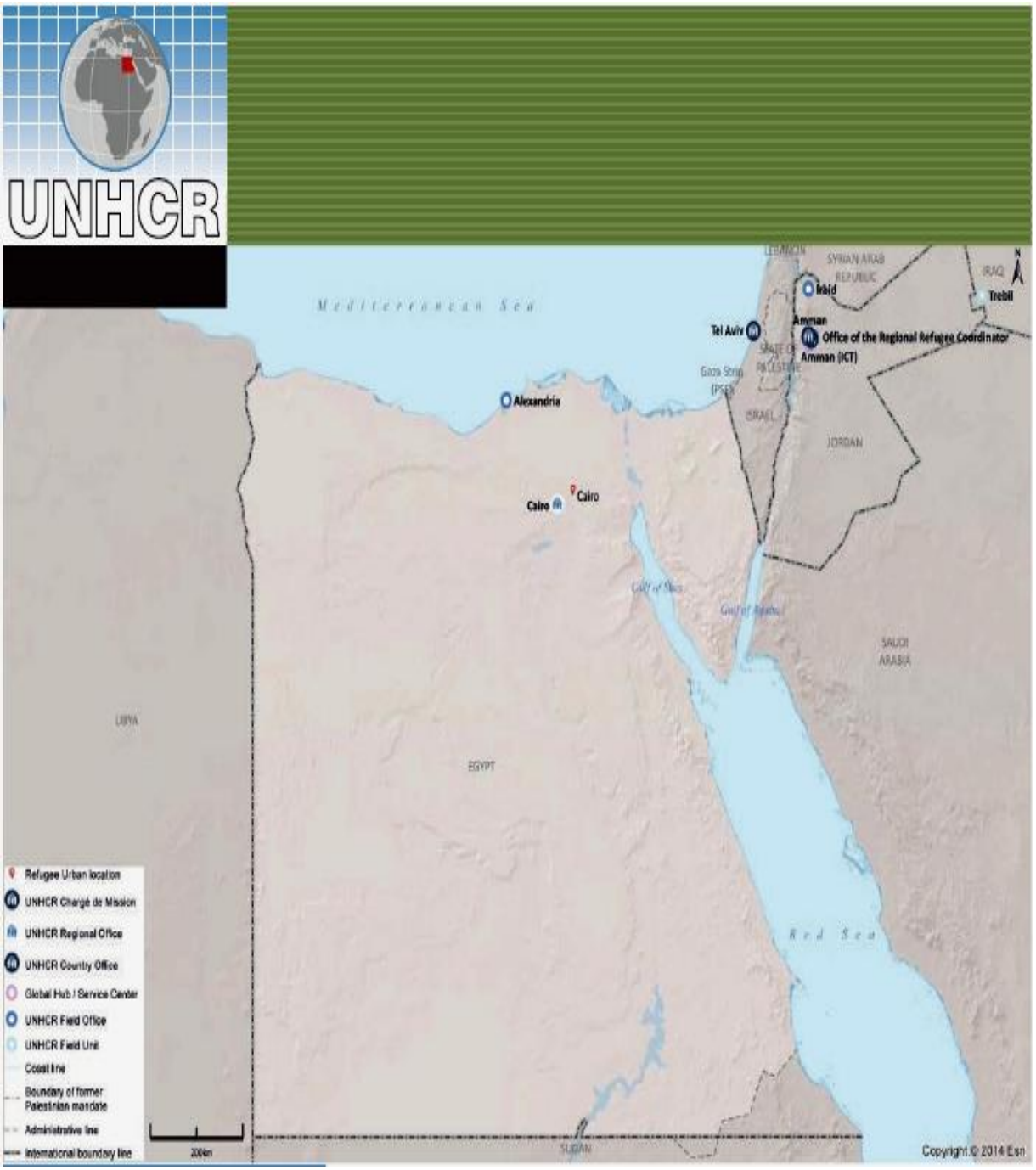
Final Report

UNHCR
IN COLLABORATION WITH

FACULTY OF MEDICINE, AIN SHAMS UNIVERSITY

Presented by

Prof Dr Amany MOKHTAR & Prof Dr Mohamed ElAWADY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Global Hub / Service Center
UNHCR Field Office
UNHCR Field Unit
Coast line
Boundary of former Palestinian mandate
Administrative line
International boundary line
200km
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TABLE OF CONTENTS

ACRONYMS AND ABBREVIATIONS

ANC	Ante Natal Clinic
AUC	American University in Cairo
CBTs	Cash-Based Transfers
CI	Confidence Interval
DEFF	Design effect
ENA	Emergency Nutrition Assessment
ENN	Emergency Nutrition Network
EPI	Expanded Programme on Immunization
FMRS	Forced Migration and Refugee Studies
GAM	Global Acute Malnutrition
GFD	General Food Distribution
GFR	General Food Ration
HAZ	Height-for-Age z-score
Hb	Haemoglobin
HH	Household
HIS	Health Information System
IAWG	Inter-agency Working Group
IPs	Implementing Partners
IYCF	Infant and Young Child Feeding
MAM	Moderate Acute Malnutrition
MCH	Maternal and Child Heath
MOH	Ministry of Health
MUAC	Middle Upper Arm Circumference
NCHS	National Centre for Health Statistics
NRR	Non-response rate
OTP	Out-patient Therapeutic Programme
PLWHA	Persons Living with HIV/AIDS
PPS	Probability Proportional to Size
ProGres	Registration database for refugee population data
SGBV	Sexual and Gender-Based Violence
SAM	Severe Acute Malnutrition
SD	Standard Deviation
SFP	Supplementary Feeding Programme
SMART	Standardised Monitoring and Assessment of Relief and Transitions
TFP	Therapeutic Feeding Programme
U5	Children under 5 years old
UNCT	United Nations Country team
UNHCR	United Nations High Commissioner for Refugees
WAZ	Weight-for-Age z-score
WHZ	Weight-for-Height z-score
WFP	World Food Programme
WHO	World Health Organization

EXECUTIVE SUMMARY

INTRODUCTION:

Egypt is a signatory to the 1951Refugee Convention and its 1967 Protocol, and the 1969 OAU Convention. Nevertheless, as the country has not yet developed national asylum procedures and institutions, UNHCR carries out the functional responsibilities for all aspects of registration, documentation and refugee status determination (RSD) under the 1954 memorandum of understanding with the Government of Egypt.

Egypt remains a transit and destination country for refugees and asylum-seekers, in particular Eritrean, Ethiopian, Iraqi, Somali, Sudanese and Syrian refugees, as well as Palestinians fleeing from the Syrian Arab Republic (Syria).

The situation of refugees and asylum-seekers in Egypt is affected by difficult socio-economic conditions, including dramatic price rises and inflation, scarce employment opportunities, negative perceptions of certain nationalities and a general deterioration of the security environment due to political instability. In addition, the trafficking and smuggling of refugees and asylum-seekers from and through Egypt remains a serious protection challenge.

Refugees in Egypt have access to public primary and emergency health care and also to a UNHCR subsidized health care services through partner NGOs in Cairo, Alexandria and Damietta

This report summarises the results of a nutrition survey conducted from 16th -26th December 2015, coordinated by UNHCR and technical support from staff of Community Medicine Department, Ain Shams Faculty of Medicine. The overall aim of this survey was to assess the prevalence of malnutrition and to monitor selected indicators of programme performance. Objectives of the survey were as follows:

Primary Objectives:

1. To measure the prevalence of acute malnutrition in children aged 6-59 months
2. To measure the prevalence of stunting in children aged 6-59 months
3. To determine the coverage of measles vaccination among children aged 12-59 months
4. To determine the coverage of vitamin A supplementation in the last 6 months among children aged 6-59 months
5. To assess the two-week period incidence of diarrhoea among children aged 6- 59 months
6. To measure the prevalence of stunting among school age children 5-19 years
7. To measure the prevalence of thinness among school age children 5-19 years
8. To measure the prevalence of anaemia in children aged 6-59 months and in women of reproductive age between 15-49 years (non-pregnant)
9. To measure the prevalence of anaemia among school age children 5-19 years
10. To investigate IYCF practices among children aged 0-23 months
11. To determine the coverage of ration cards and the duration the general food ration lasts for recipient households

12. To determine the extent to which negative coping strategies are used by households
13. To assess household dietary diversity

Secondary Objectives:

1. To assess the coverage of iron-folic acid supplementation in pregnant women.

METHODOLOGY:

The survey was based on the UNHCR Standardised Expanded Nutrition Survey (SENS) guidelines for refugee populations (v1.3) and the Standardized Monitoring and assessment of Relief and Transitions (SMART) methodology (v1). Stratified proportionate sampling was used to estimate a representative sample of households and children for the different studied nationalities. The stratification was done based on the percentage of each of the studied nationality within the sample frame. Population data was obtained from the UNHCR's Egypt database, which had the addresses of all registered refugees.

The sample size was calculated based on the expected prevalence of global acute malnutrition (GAM) of (10%) in children 6-59 months of age with a desired precision of +/- 3%, proportion of children below 5 years (9%), and average household size (5), with a 10% allowance for non-response. The resultant required sample size was 972 households and 354 children.

All eligible children aged 0-59 months from all selected households were included in the assessment of anthropometry, health and infant and young child feeding (0-23 months), and school aged children and adolescents (5-19 years). After invitation of the HH to come to the survey sites, the HH members turning up were verified by checking of UNHCR ID card to cross check the HH reporting members identity with the printed out lists of HH and the children of various age groups and women of reproductive age groups subject of the survey. According to SENS guidelines half of the selected households (486) should be selected for Food Security, and women anaemia measurements, however we included all the captured households for food security and anaemia measurement.

Data collection was done at the survey sites; Refuge Egypt 6th October clinic, Sanabel clinic, Tadamon Maadi and Nasr city community Centre. A total of ten teams collected data during the survey, each comprising of (8-13) members. Haemoglobin assessment was done also at the same 4 sites using the Mission Plus Hb testing device.

Specific questionnaires were designed to provide information on the relevant indicators for the different target groups, as indicated in the survey objectives and based on the standard SENS questionnaires, data were entered into ENA and SPSS templates concurrently with data collection. Data analysis was on-going using ENA for SMART software to analyse anthropometric data, and SPSS 20 software for the remaining data.

SUMMARY OF RESULTS

Summary of key findings for the whole sample, December 2015

	Number / total	% (95% CI)	Classification of public health significance or target (where applicable)
CHILDREN 6-59 months			
Acute Malnutrition (WHO 2006 Growth Standards)			
Global Acute Malnutrition (GAM)	36/547	6.6 (4.8-9.0)	Critical if ≥ 15%
Moderate Acute Malnutrition (MAM)	25/547	4.6 (3.1-6.7)	
Severe Acute Malnutrition (SAM)	11/547	2.0 (1.1-3.6)	
Oedema	0/547		
Mid Upper Arm Circumference (MUAC)			
MUAC <125mm and/or oedema	13/558	2.3 (1.4 - 3.9)	
MUAC 11.5-12.4 cm	5/558	0.9 (0.4 - 2.1)	
MUAC <11.5 cm and/or oedema	8/558	1.4 (0.7 - 2.8)	
Stunting (WHO 2006 Growth Standards)			
Total Stunting	55/558	9.9 (7.7-12.6)	Critical if ≥ 40%
Severe Stunting	19/558	3.4 (2.2-5.3)	
Programme coverage			
Measles vaccination recorded from card or recall (9-59 months)	397/534	74.3 (56.9-70.1)	Target of ≥ 95%
Vitamin A supplementation in last 6 months with card or recall	213/601	35.4 (26.6-38.5)	Target of ≥ 90%
Diarrhoea			
Diarrhoea in last 2 weeks	182/601	30.3 (28.9-39.7)	
Anaemia			
Total Anaemia (Hb <11 g/dl)	386/506	76.3 (61.7-73.3)	High if ≥ 40%
Mild (Hb 10-10.9)	112/506	22.1 (18.5-28.7)	
Moderate (Hb 7-9.9)	233/506	46.0 (33.8-45.4)	
Severe (Hb<7)	41/506	8.1 (3.3-7.7)	
CHILDREN 0-23 months			
IYCF indicators			
Timely initiation of breastfeeding	85/249	34.1(27.2 - 42.8)	
Exclusive Breastfeeding under 6 months	14/56	24.6 (12.3 - 42.6)	
Continued breastfeeding at 1 year	33/46	71.7(46.1-82.1)	
Continued breastfeeding at 2 years	13/37	35.1(19.9 - 63.7)	
Introduction of solid, semi-solid or soft foods	17/30	56.7(22.5 - 66.7)	
Consumption of iron-rich or iron-fortified foods	56/198	28.3 (16.7 - 31.4)	
Bottle feeding	143/256	55.9(51.8 - 67.2)	
WOMEN (15-49 years)			
Anaemia (non-pregnant)			
Total Anaemia (Hb <12 g/dl)	271/519	52.2 (47.7-56.6)	High if ≥ 40%
Mild (Hb 11-11.9 g/dl)	124/519	23.9 (20-27.7)	
Moderate (Hb 8-10.9 g/dl)	129/519	24.9 (21.2-29.1)	
Severe (Hb<8.0 g/dl)	18/519	3.5 (2.2-5.8)	
School aged children and adolescents 5-19 years			
Thinness			
Total thinness	88/845	10.4(8.2 -14.9)	

	Number / total	% (95% CI)	Classification of public health significance or target (where applicable)
Severe thinness	45/845	5.3(3.8 - 9.3)	
Stunting			
Total stunting	47/845	5.6(3.8 - 8.1)	
Severe stunting	16/845	1.9(0.9 - 3.1)	
Anaemia 5-11 years			
Total Anaemia (Hb <11.5 g/dl)	254/477	53.2 (39.4 -51.5)	
Mild (Hb 11-11.4)	64/477	13.4 (10.1 -17.8)	
Moderate (Hb 8-10.9)	183/477	38.4 (25.2 -36.0)	
Severe (Hb <8)	7/477	1.5 (0.6 -3.8)	
Anaemia 12-14years			
Total Anaemia (Hb <12 g/dl)	84/146	57.5 (40.3 - 60.2)	
Mild (Hb 11-11.9)	36/146	24.7 (14.4 - 31.6)	
Moderate (Hb 8-10.9)	46/146	31.5 (18.9 - 36.3)	
Severe (Hb <8)	2/146	1.4 (0.3 - 8.7)	
Anaemia 15-19 years (females)			
Total Anaemia (Hb <12 g/dl)	30/78	38.5 (27.3 - 53.0)	
Mild (Hb 11-11.9)	12/78	15.4 (9.1 - 26.8)	
Moderate (Hb 8-10.9)	16/78	20.5 (11.5 - 31.7)	
Severe (Hb <8)	2/78	2.6(0.9 - 13.9)	
Anaemia 15-19 years (males)			
Total Anaemia (Hb <13 g/dl)	22/56	39.3 (16.0 - 49.5)	
Mild (Hb 11-12.9)	12/56	21.4 (8.4 - 43.0)	
Moderate (Hb 8-10.9)	10/56	17.9 (4.4 - 18.7)	
Severe (Hb <8)	0/56		
FOOD SECURITY			
Food distribution			
Proportion of households with a ration card	163/605	26.9 (30.2-38.3)	
Average number of days general food ration lasts out of 30 days (mean, 95% CI)	5.5 (3.6 -7.3)		
Negative household coping strategies			
Proportion of households reporting using none of the coping strategies over the past month	28/597	4.7 (2.6 - 5.9)	
Household dietary diversity			
Average HDDS (mean, 95% CI)	5.6 (5.4 - 5.7)		

Summary of key findings for the different nationalities, December 2015

	Sudanese	Ethiopian	Eritrean	Somali	Iraqi	Classification of public health significance / target (where applicable)
	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	
CHILDREN (6-59 months)						
Acute Malnutrition (WHO 2006 Growth Standards)						
Global Acute Malnutrition (GAM)	6.5((4.0 - 10.2)	6.1 (3.2 - 11.2)	9.7 (4.5 - 19.5)	8.9 (3.9 - 19.3)	0.0 (0.0 - 10.4)	Critical if ≥ 15%
Moderate Acute Malnutrition (MAM)	3.6 (1.9 - 6.8)	4.7 (2.3 - 9.4)	8.1 (3.5 - 17.5)	7.1 (2.8 - 17.0)	0.0 (0.0 - 10.4)	
Severe Acute Malnutrition (SAM)	2.8 (1.4 - 5.7)	1.4 (0.4 - 4.8)	1.6 (0.3 - 8.6)	1.8 (0.3 - 9.4)	0.0 (0.0 - 10.4)	
Oedema	—	—	—	—	—	
Mid Upper Arm Circumference (MUAC)						
MUAC <125mm and/or oedema	2.8 (1.3 - 5.6)	0.0 (0.0 - 2.5)	1.7 (0.3 - 9.1)	0.0 (0.0 – 6.0)	0.0 (0.0 - 10.4)	
MUAC 11.5-12.4 cm	2.0 (0.8 - 4.5)	0.0 (0.0 - 2.5)	0.0 (0.0 - 6.2)	0.0 (0.0 - 6.0)	0.0 (0.0 - 10.4)	
MUAC <11.5 cm and/or oedema	0.8 (0.2 - 2.8)	0.0 (0.0 - 2.5)	1.7 (0.3 - 9.1)	0.0 (0.0 - 6.0)	0.0 (0.0 - 10.4)	
Stunting (WHO 2006 Growth Standards)						
Total Stunting	8.6 (5.1 - 14.2)	9.7 (6.0 - 15.4)	19.0 (11.2 - 30.4)	8.5 (3.7 - 18.4)	9.1 (3.1 - 23.6)	Critical if ≥ 40%
Severe Stunting	2.6 (1.0 - 6.6)	2.6 (1.0 - 6.4)	6.3 (2.5 - 15.2)	3.4 (0.9 - 11.5)	6.1 (1.7 - 19.6)	
Programme coverage						
Measles vaccination with card or recall (12-59 months)	81.7 (75.7-86.4)	53.2 (43.2-63.0)	87.7 (77.3-93.8)	71.4 (55.1-83.6)	90.3 (74.3-96.8)	Target of ≥ 95%
Vitamin A supplementation within past 6 months with card or recall	39.4 (32.5-46.6)	29.1 (21.3-38.4)	44.4 (30.4-59.4)	27.1 (16.6-41)	33.3 (17.9-53.5)	Target of ≥ 90%
Diarrhoea						
Diarrhoea in last 2 weeks	27.8 (22.5-33.8)	38 (30.3-46.3)	28.6 (18.8-40.9)	21.4 (12.7-33.8)	36.4 (23.4-51.7)	

	Sudanese	Ethiopian	Eritrean	Somali	Iraqi	Classification of public health significance / target (where applicable)
	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	
Anaemia						
Total Anaemia (Hb <11 g/dl)	87.7 (82.4-91.6)	62 (53.2-70.1)	70 (55.5-81.4)	74.1 (60.7-84.1)	70.4 (53-83.3)	High if ≥ 40%
Mild (Hb 10-10.9 g/dl)	21.5 (16.5-2.75)	24.8 (18.1-33)	13.3 (6.9-24.3)	33.3 (22-47)	11.1 (3.7-29.1)	
Moderate (Hb 7-9.9 g/dl)	54.4 (47.5-61.1)	34.3 (26.4-43.1)	50 (36.4-63.6)	33.3 (21.2-48.1)	51.9 (34.2-69.1)	
Severe (Hb<7.0 g/dl)	11.8 (8.2-16.8)	2.9 (1.1-7.5)	6.7 (2.5-16.3)	7.4 (2.8-17.9)	7.4 (1.9-24.9)	
CHILDREN 0-23 months						
IYCF indicators						
Timely initiation of breastfeeding	39.7(31.1- 48.9)	37.5(26.5 -50.0)	29.2(14.3 - 50.4)	10.3(3.3 -27.9)	31.3(15.3 -53.3)	
Exclusive Breastfeeding under 6 months	25.0(12.3-44.2)	23.5 (8.7-49.8)	25.0(3.1-77.5)	25.0(3.9-73.4)	33.3(3.9-86.2)	
Continued breastfeeding at 1 year	94.7(68.1-99.3)	70.0(36.0 -90.6)	66.7(13.7-96.2)	55.6(23.5- 83.6)	20.0(2.4- 72.1)	
Continued breastfeeding at 2 years	35.0(16.9 - 58.8)	50.0 (15.9 -84.1)	40.0 (7.1-85.3)	33.3(4.0 -85.8)	_	
Introduction of solid, semi-solid or soft foods	63.6(30.4 - 87.50)	30.0(8.7 - 65.7)	66.7(12.2 - 96.7)	80.0(25.0 - 98.0)	100(100.0 - 100.0)	
Consumption of iron-rich or iron-fortified foods	30.0(21.3 - 40.4)	18.0(9.6 -31.3)	15.0(4.8 -38.2)	44.0(26.2 - 63.5)	46.2(21.1 -73.4)	
Bottle feeding	46.6(37.6 -55.9)	62.3(50.3 -73.0)	45.8(26.6 - 66.4)	86.2(68.2 - 94.8)	56.3(35.1 - 75.4)	
WOMEN 15-49 years						
Anaemia (non-pregnant)						
Total Anaemia (Hb <12 g/dl)	54.6 (47.5-61.5)	49.4 (41.4-57.3)	53.2 (42.6-63.6)	46.0 (32.8-59.8)	58.6 (39.8-75.2)	High if ≥ 40%
Mild (Hb 11-11.9)	24.6 (18.9-31.4)	20.5 (14.9-27.5)	26.0 (17.2-37.3)	26.0 (15.8-39.7)	27.6 (13.5-48.1)	
Moderate (Hb 8-10.9)	27.5 (21.5-34.6)	25 (18.7-32.5)	22.1 (14.1-32.4)	16.0 (8.1-29.1)	27.6 (14.2-46.6)	
Severe (Hb <8)	2.4 (1.0-5.7)	3.8 (1.7-8.3)	5.2 (2.0-13)	4.0 (1-14.8)	3.4 (0.5-21.1)	

	Sudanese	Ethiopian	Eritrean	Somali	Iraqi	Classification of public health significance / target (where applicable)
	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	
School aged children and adolescents 5-19 years						
Thinness						
Total thinness	8.1(5.3 - 12.3)	12.4(8.0 - 18.8)	9.5(5.6 - 15.6)	20.4(9.6 - 38.3)	10.4(4.1-24.0)	
Severe thinness	2.8(1.4 - 5.3)	6.4(3.2 - 12.4)	6.6(3.5 - 11.9)	12.2(6.9 -20.9)	7.5(2.5 -20.1)	
Stunting						
Total stunting	4.5(2.7 - 7.2)	3.8(2.0 -7.2)	11.7(6.2 - 20.8)	4.1(0.9 - 16.5)	6(2.4 - 14.1)	
Severe stunting	2.0(1.0 - 4.0)	0.9(0.2 - 3.3)	3.6(1.2 - 10.3)	2.0(0.3 -14.7)	1.5(0.2 - 10.4)	
Anaemia 5-11 years						
Total Anaemia (Hb <11.5 g/dl)	62.9(55.1-70.1)	34.7(26.6 - 43.9)	57.7 (43.6 -70.6)	62.1(41.6-79.0)	41.7(26.0- 59.2)	
Mild (Hb 11-11.4)	15.0(10.8-20.5)	13.2(8.6 - 19.8)	14.1(6.9 -26.5)	6.9(2.0- 21.3)	8.3(2.9- 21.5)	
Moderate (Hb 8-10.9)	46.0(38.5-53.7)	19.8(13.6 - 28.1)	42.3(29.5 -56.2)	55.2(33.9-74.7)	33.3(18.1- 53.1)	
Severe (Hb <8)	1.9(0.7- 4.9)	1.7(0.4 - 6.4)	1.3(0.2 - 8.3)	—	—	
Anaemia 12-14years						
Total Anaemia (Hb <12 g/dl)	65.7(53.8-75.9)	43.2(28.8 - 59.0)	51.9(32.9 -70.2)	57.1(27.1-82.7)	75.0(25.1-96.4)	
Mild (Hb 11-11.9)	26.9(17.4 -39.0)	21.6(11.0 - 38.1)	14.8(4.8 -37.3)	14.3(1.8-59.8)	62.5(21.5- 91.0)	
Moderate (Hb 8-10.9)	37.3(26.7- 49.3)	18.9(8.7- 36.4)	37.0(23.3 - 53.3)	42.9(17.3-72.9)	12.5(1.6-56.1)	
Severe (Hb <8)	1.5(0.2- 10.0)	2.7(0.4- 16.2)				
Anaemia 15-19 years (females)						
Total Anaemia (Hb <12 g/dl)	33.3(20.3- 49.6)	34.4(20.1 - 52.2)	77.8(48.6 -92.8)	—	66.7(15.1- 95.8)	
Mild (Hb 11-11.9)	6.7(1.6- 23.5)	12.5(5.2 - 27.3)	44.4(18.5 -73.9)	—	66.7(15.1-95.8)	
Moderate (Hb 8-10.9)	26.7(15.1- 42.7)	18.8(8.9 - 35.4)	22.2(9.5 -43.6)	—	—	
Severe (Hb <8)	—	3.1(0.4 -19.5)	11.1(1.8 -46.5)	—	—	

	Sudanese	Ethiopian	Eritrean	Somali	Iraqi	Classification of public health significance / target (where applicable)
	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	
Anaemia 15-19 years (males)						
Total Anaemia (Hb <13 g/dl)	65.0(43.6- 81.7)	26.7(7.2 - 62.9)	20.0 (7.2- 44.4)	__	66.7(33.0- 89.0)	
Mild (Hb 11-12.9)	30.0(13.8-53.4)	26.7 (7.2 - 62.9)	6.7(1.0 -33.2)	__	33.3(2.9-89.2)	
Moderate (Hb 8-10.9)	35.0(18.3- 56.4)	__	13.3(3.5 -39.8)	__	33.3(11.0-67.0)	
Severe (Hb <8)	__	__	__	__		
FOOD SECURITY						
Food distribution						
Proportion of household with a ration card (Offered by refugee Egypt and other charity organizations)	14.9 (10.9 -20.0)	54.4(47.1-61.6)	25.3(16.9 -36.1)	9.2 (4.2 -19.1)	7.7(2.5 -21.4)	
Average number of days GFR lasts out of 30 days[1](mean with 95% CI)	7.6(3.2 - 12.1)	5.1(2.8 - 7.4)	4.7(2.3 - 7.1)	14.0(14.0-14.0)	11.0(-1.6 -23.6)	
Negative household coping strategies						
Proportion of households reporting using none of the coping strategies over the past month	5.4 (3.2-9.1)	2.8 (1.2-6.6)	2.6 (0.6-9.8)	6.3 (2.4-15.8)	10.5 (4.0-25.0)	
Household dietary diversity						
Average HDDS (mean, 95% CI)	6.45 (6.21-6.7)	4.83 (4.59-5.1)	5.7 (5.36-6.04)	5.48 (5.0-5.95)	7.54 (7.1-7.98)	

INTERPRETATION OF RESULTS

Food, Nutrition and Anaemia

- The prevalence of GAM is low (6.6%) and below the WHO emergency threshold of 15% , however it is slightly higher than the UNHCR threshold of 5%
- Total prevalence of stunting among children 6-59 months and among school aged children, adolescents 5-19 years is fairly low (9.9%&5.6%respectively), probable reasons for this may include low dietary diversity score.
- The prevalence of anaemia, among children 6-59 months, school aged children, adolescents and non-pregnant women of reproductive age (15-49 years), and in the studied nationalities is considered high according to WHO classifications.
- The prevalence of exclusive breastfeeding is considered low, improvements are needed in the protection, promotion and support of infant and young children feeding practices, indicated by a low prevalence of continued breastfeeding at 2 years, and low prevalence of consumption of iron-rich or iron-fortified foods and late introduction of solid/semi-solid or soft foods.

Food security

- The proportion of households with a ration card among refugees from the selected 5 nationalities was very low covering about 25% of the whole sample with the lowest supply being for Iraqi and Somali nationalities .However this figure should be interpreted cautiously as food distribution at Refuge Egypt is a targeted distribution for the well-baby and well-child clinics children beneficiaries and not all under five years children and is done as a food ration distribution on monthly basis whereas for TB patients and PLHIV clinic beneficiaries food ration distribution is done every 2 weeks (twice / month) , this may limit clear interpretation of these results.

- Household dietary diversity was low, with households eating 5.6 out of a total of 12 food groups in the 24 hours before the survey, the most common being cereals (consumed by nearly all households (97.7%), followed by spices and condiments (95.9%)and oils/fats(85.3%).
- The two most common negative coping strategies over the last month before the survey were to reduce the quantity and/or frequency of meals, and borrow cash, food and other items (without interest).

Health related findings

- Prevalence of diarrhoea in the last two weeks before the survey was (~30%) among children 6-59 months.
- There has been low coverage of measles vaccination and vitamin A supplementation and were not being consistently recorded on child health cards.

RECOMMENDATIONS:

Immediate term

1. Given the high prevalence of anaemia among the under five children, school aged children, adolescents, and women of reproductive age, both therapeutic and preventive interventions should be maintained by UNHCR through existing nutritional interventions with NGOs partners as Refuge Egypt well-baby and well- child clinics and mainstreamed into MOH MCH services and other Public responses.

2. WFP to supplement feeding programme for children 6-23 months of age to help ensure that improvements in nutrition situation of infants and young children is sustained, and a reduction of anaemia to acceptable levels is achieved. Ensure increased awareness and sensitisation for proper use of the supplementary foods in the target group through household visits, education, and mother-to-mother support groups. .

3. The UNHCR and Health partners have to strengthen routine measles vaccination, vitamin A supplementation for children 6-59 months through defaulter tracing and house to house checking of immunisation status by Community Health Workers. Improving the supply and retention of health record cards for children, and enhancing the recording of key information

4. Community Health Workers support is also needed to improve documentation of Vitamin A supplementation and measles vaccinations in child health books.

Medium term

1. UNHCR Partners are to reinforce activities to improve dietary diversity at household level, and considering the provision of appropriate (non-perishable) complementary foods for example, beans and canned tuna, considering the challenges in buying, transporting and distributing perishable foods at a large scale.

2. WFP and UNHCR to conduct an expanded food security assessment to understand the causes of food insecurity at the household level and, where appropriate, design food security interventions that can support or complement a GFD e.g. food vouchers, cash transfers or vouchers for non-food items.

3. UNHCR is to also support all nutritional awareness activities at partner health NGOs services for mothers and children for the promotion of consumption of iron and vitamin C rich foods and other dietary measures. Intervention could also include awareness raising in schools, through community workers etc., coordination with WFP for up scaling school feeding programmes.

4. Health partners to conduct qualitative assessments of the health-seeking behaviour of new arrivals, with the aim of improving uptake of services and preventing a deterioration of their nutritional status.

5. After 2 years, UNHCR should conduct another cross sectional nutrition survey and within the findings of the households dietary diversity findings the study design should allow separate survey and analysis for each nationality to better inform on many aspects of IYCF feeding practices and also school age and mothers feeding practices to better inform on needed awareness and changing of dietary feeding habits as warranted to promote sound growth and nutritional well-being at household level and to better designs of program interventions.

6. The UNHCR should conduct an in depth study to investigate the risk factors for anaemia among different age groups and women in the reproductive age.

7. The UNHCR should conduct an in depth study to investigate the causes of low vitamin A supplementation and low coverage of measles and other compulsory vaccines.

Long term

1. Improve and scale up the livelihood opportunities for the refugees through developmental-oriented initiatives to improve their economic status.

2. All partners to provide and monitor programmes to aid with end line impact evaluations, for example, consistent supply of the feeding programs.

3. Maintain integrated approach to programming, and ensure sufficient training for new community health workers, and timely re-fresher training where necessary.

1. Introduction

This report provides information from the nutrition survey conducted in Egypt among Sudanese, Eritrean, Ethiopian, Somali and Iraqi refugees. This survey was commissioned by UNHCR from 16th -26th December 2015.

This report is divided into the following sections:

- *Background*: In this section the background information related to the health, nutrition and food security situation is reported for refugees in Egypt as a whole.
- The *methodology*: the methodology used for the surveys was performed according to the SENS guidelines, and SMART methodology, but differed for school age children.
- The *results* are reported for the whole sample and separately for the different nationalities.
- The *discussion* refers to all the studied refugees. It highlights similarities and differences in trends and trend monitoring over previous surveys.
- *Recommendations* are made for the studied refugees as a whole because of the limited variation in the findings between the five nationalities.

1.1 Background

Egypt is a signatory to the 1951 Refugee Convention and its 1967 Protocol, and the 1969 OAU Convention. Nevertheless, as the country has not yet developed national asylum procedures and institutions, UNHCR carries out the functional responsibilities for all aspects of registration, documentation and refugee status determination (RSD) under the 1954 memorandum of understanding with the Government of Egypt (UNHCR Global Appeal 2015 Update).

Since 2000, the Forced Migration and Refugee Studies (FMRS) at the American University in Cairo (AUC) has built up a body of localized studies on different aspects of life for different groups of refugees in Cairo. These include studies on the situation for Palestinian refugees (El-Abed 2003), livelihoods and constructions of identity among Somali refugees (Al Sharmani 2003), livelihood and coping strategies of Sudanese refugees (Grabska 2005), the experiences of unaccompanied minors seeking asylum in Egypt (Maxwell & Al-hilaly 2004) and health education among urban refugees (Bichard et al. 2003).

UNHCR Egypt coordinates with its partners through three main channels: the Government of Egypt, the United Nations Country team (UNCT), the interagency working group (IAWG) and sectoral subgroups. The Inter-agency Working Group (IAWG) is the main agency coordination body for refugee response in Egypt. The IAWG oversees five sectorial working groups: Communication with Beneficiaries, Protection, Health, Education, Livelihoods, & Basic needs and Food security. Each working group has its specific set of partners, including government counterparts, donors, international agencies, international and national NGOs. Under the protection WG, there are three sub working group covering child protection, SGBV & psycho-social support (UNHCR, 2016).

UNHCR's health program focuses on primary and emergency care services along with prioritized secondary and tertiary healthcare, through the access of public and NGO-based primary, mental and reproductive health services for refugees. These services are provided by UNHCR's implementing partners (UNHCR, 2016)

However, little is known about the nutritional status of urban refugees in Egypt. A cross-sectional study was conducted in 2004 to assess the prevalence of malnutrition in a sample of refugee children in Cairo. This study surveyed a sample of African refugee children (n=201) under two years of age. In this sample, 13% of refugee children were stunted, 4% were underweight and 8% were wasted. Older children were significantly smaller than reference children of the same age (Turnbull, 2004).

UNHCR is assisting the MoH with the upgrade and refurbishment of Primary Healthcare clinics and provision of specialized medical equipment to hospitals in refugee hosting areas.

1.2 Food Security

Food distribution at Refuge Egypt is a targeted distribution for the well-baby and well-child clinics children beneficiaries and not all under five years children and is done as a food ration distribution on monthly basis whereas for TB patients and PLHIV clinic beneficiaries food ration distribution is done every 2 weeks (twice / month)

Primary recipients of the food ration are the Mothers of children aged 0-2 years (well-baby clinic) including lactating mothers. Refuge Egypt therefore abide by UNHCR, UNICEF and WHO policies on exclusive breast feeding for infants feeding for the first 6 months and gradual weaning starting from 6 months . Starting from the completion of first year, toddlers become also recipients of the powdered milk .So for infants' feeding it is the lactating mothers who will be the recipients and consumers of the powdered milk. For the well child clinics, Mothers with children aged 2 to 5 years will be and their children the consumers of the powdered milk and Refuge Egypt IYCF practices is subject of on-going awareness raising of attendant mothers of the well-baby and well-child clinics

Table 1: Composition of monthly food ration offered by Refuge Egypt at the well-baby & well child clinic WBCC every 2 weeks

Powder Milk	300 gm
Peanut butter	350 gm
Rice	1 Kg
Lentil	1 Kg
Biscuits with date	12 pieces
Dark honey	450 gm
Cheese	8 pieces

Table 2: Composition of monthly food ration offered by Refuge Egypt for persons suffering chronic communicable diseases

Powder Milk	300 gm
Peanut butter	350 gm
Rice	1 Kg
Lentil	1 Kg
Sugar	1 Kg
Oil	1 Liter
Cheese cooked	8 pieces

1.3 Health situation

The Egyptian Ministry of Health regulations permit all persons legally residing on its territory to have equal access to primary health care and emergency care services as for nationals. All registered refugees and persons of concern to UNHCR can therefore access public primary and emergency health care in Egypt. Public primary curative health care access is determined by nominal fees set for nationals, whereas some preventative health services such as immunization is given for free to all children with birth certificates issued in Egypt (UNHCR, 2011).

Private medical facilities offering different primary, secondary and tertiary care services are receptive to refugees and charge varying fees as set by these facilities. These facilities operate with a license from and under the relevant supervising Ministry of Health medical authority for private medical services (UNHCR, 2011).

In general, UNHCR provides primary health care through its implementing partners Caritas and Refuge Egypt for refugees and asylum seekers. Some secondary and tertiary health care may be provided for recognized refugees and is dependent on availability of resources (UNHCR, 2011).

While the Government of Egypt grants some access to public primary health care and education, specialized public care for chronic illnesses and rehabilitative interventions is not available to people of concern, nor are various national public insurance schemes (UNHCR Global Appeal 2015 Update).

Caritas addresses primary health care, and provides referrals for general medical and surgical care. Caritas has contacts with other health facilities between Cairo and Alexandria, which recognize the UNHCR card and deliver medical care for persons referred from Caritas. Persons of concern to UNHCR can also approach these facilities and present their cards directly in emergency situations (UNHCR, 2011).

Caritas has also established a referral network of branch laboratories, imaging centres and optometrists between Cairo and Alexandria. A network of pharmacies has been established to deliver prescribed and agreed medicines by Caritas primary and referral care services. Caritas can only subsidize referrals to these complementary diagnostic laboratories and imaging services if the referral is made by a Caritas treating doctor (UNHCR, 2011).

In the month of September, 2015, 6,699 patients visited UNHCR‘s health providers’ clinics Caritas and Refuge Egypt. 3,976 patients received treatment at the clinics, while 2,723 were referred for investigations or specialized care. Furthermore, UNHCR’s health provider Refuge Egypt conducted 606 ante-natal care consultations and growth monitoring for 294 children under five years (UNHCR operational update, 2015).

In March, 2016 Caritas Egypt refugees’ clinic reported that 8564 patients visited the clinic (table 3). (75 %) were in the age group (18-60), Sudanese (37.4 %), Somali (20.7%), Iraqi (18%), Ethiopian (12.3%) and Eritrean (9.5%) (Caritas Egypt refugee clinics, 2016)

On the other hand, Refuge Egypt provides antenatal, natal, post-natal hospital and home visits and early neonatal care for recognized refugees and asylum seekers in accordance with its own criteria (UNHCR, 2011).

Refuge Egypt has a well baby clinic for children aged 0-2 years and a well child clinic for children aged 2-5 years which serve infants and children irrespective of their status as refugees or asylum seekers using registration criteria set by Refuge Egypt (UNHCR, 2011).

Table 3: Caritas clinic distribution of refugee attendants during March-2016 according to Sex, Age group and Nationality

Date	Sex					Age –groups					Nationality						
	Males	Female	boys	girls	Total	0-4	4-18	18-60	60- ∞	Total	Sudanese	Somali	Iraqi	Eritrian	Ethiopian	others	Total
1-3-2016	163	198	24	39	**424**	43	42	303	36	**424**	163	91	82	33	37	18	**424**
2-3-2016	128	143	17	21	**309**	16	29	239	25	**309**	123	69	50	24	38	5	**309**
3-3-2016	156	174	27	41	**398**	29	45	285	39	**398**	129	75	70	53	56	15	**398**
4-3-2016	189	198	38	39	**464**	43	62	319	40	**464**	179	91	92	37	47	18	**464**
7-3-2016	162	171	20	36	**389**	28	30	302	29	**389**	141	89	74	34	41	10	**389**
8-3-2016	135	153	11	16	**315**	8	24	266	17	**315**	127	74	49	20	41	4	**315**
9-3-2016	109	141	13	19	**282**	18	26	219	19	**282**	112	62	42	29	34	3	**282**
10-3-2016	163	156	31	42	**392**	34	38	286	34	**392**	146	69	59	42	55	21	**392**
11-3-2016	189	226	34	47	**496**	52	63	331	50	**496**	178	91	99	58	49	21	**496**
14-3-2016	155	169	52	39	**415**	39	41	302	33	**415**	156	83	81	37	51	7	**415**
15-3-2016	155	175	40	52	**422**	39	42	308	33	**422**	161	83	79	37	51	11	**422**
16-3-2016	129	144	14	27	**314**	18	33	236	27	**314**	121	68	52	29	33	11	**314**
17-3-2016	138	170	26	30	**364**	20	39	274	31	**364**	129	70	57	45	49	14	**364**
18-3-2016	155	165	39	57	**416**	39	46	298	33	**416**	155	83	79	37	51	11	**416**
21-3-2016	151	168	20	29	**368**	15	34	297	22	**368**	137	81	63	31	50	6	**368**
22-3-2016	131	151	23	32	**337**	26	30	257	24	**337**	132	72	64	31	38	0	**337**
23-3-2016	138	129	16	18	**301**	24	33	229	15	**301**	128	61	41	25	44	2	**301**
24-3-2016	139	167	23	27	**356**	13	39	274	30	**356**	119	70	57	44	56	10	**356**
25-3-2016	173	191	33	44	**441**	49	36	313	43	**441**	152	91	76	48	58	16	**441**
28-3-2016	140	157	15	17	**329**	18	28	266	17	**329**	127	75	55	20	48	4	**329**
29-3-2016	132	152	23	32	**339**	27	31	256	25	**339**	133	73	64	31	36	2	**339**
30-3-2016	129	141	16	18	**304**	21	17	251	15	**304**	116	63	51	35	39	0	**304**
31-3-2016	169	159	25	36	**389**	28	37	286	38	**389**	141	87	74	30	48	9	**389**
Total	**3428**	**3798**	**580**	**758**	**8564**	**647**	**845**	**6397**	**675**	**8564**	**3205**	**1771**	**1510**	**810**	**1050**	**218**	**8564**

1.4 Nutrition

A little is known about the nutritional status of urban refugees in Egypt, Accordingly trends in prevalence of malnutrition, and anaemia among children and women cannot be assessed. The only study conducted in 2004 was to assess the prevalence of malnutrition among a sample of African refugee children in Cairo. In this sample, 13% of refugee children under two years of age were stunted, 4% were underweight and 8% were wasted. Older children were significantly smaller than reference children of the same age (Turnbull 2004).

Current Nutrition Services and Activities

- Targeted food distribution supplementation at Refuge Egypt for the well-baby and well-child clinics children beneficiaries and not all under five years children, is done as a food ration distribution on monthly basis whereas for TB patients and PLHIV clinic beneficiaries food ration distribution is done every 2 weeks (twice / month)

- Primary recipients of the food ration are the Mothers of children aged 0-2 years (well-baby clinic) including lactating mothers.

- Starting from the completion of first year, toddlers become also recipients of the powdered milk.

- So for infants feeding it is the lactating mothers who will be the recipients and consumers of the powdered milk. For the well child clinics, Mothers with children aged 2 to 5 years will be and their children the consumers of the powdered milk and Refuge Egypt IYCF practices is subject of ongoing awareness raising of attendant mothers of the well-baby and well-child clinics.

- The Egyptian government has a national school feeding programme in place that aims at increasing school attendance rates, however, a large number of schools remain untargeted, especially community schools. This national program does not cover African or Iraqi refugees joining the refugee community schools, however in a limited number of community schools, breakfast feeding is offered to attendant students.

- WFP supports the Egyptian government's school feeding initiative to reach out to a larger number of schools through providing food incentives in community schools.

- In 2015, WFP is scaling up its school feeding programme through a European Union-funded project singed in July 2014. Through this project WFP will be reaching this year more than one million children and their families in 16 of Egypt's most vulnerable governorates.

- WFP's current activities in Egypt also include efforts to:

    - Enable national institutions to systematically monitor and respond to food security risks, provide evidence-based analysis for food security policy, and support food-based social safety net reform efforts.

- Enhance access to nursery and primary education and combat child labour through food incentives given to children and their families to encourage enrolment and retention in schools.

- Enable poor communities in rural Upper Egypt and border governorates to adapt to climate change and market shocks, reduce agricultural losses through supporting national efforts to create sustainable livelihoods.

- Strengthen national capacity to prevent chronic malnutrition among the most vulnerable populations.

- Provide food assistance to vulnerable Syrian refugees residing in Egypt, upon the government's request, as part of WFP's Syria Regional Refugee Response.

- Refugees receive assistance in the form of monthly cash-based transfers (CBTs) through a voucher modality, which supports the local economy through partner supermarkets and allows people greater choice and dignity.

- WFP supports the participation of women in all aspects of assistance. Cultural preferences are accommodated at voucher distribution sites by means of separate waiting areas and female staff available onsite (WFP, 2016)

2. Survey Objectives

The nutrition survey was conducted with the aim of assessing the following objectives:

Primary Objectives:

1. To measure the prevalence of acute malnutrition in children aged 6-59 months
2. To measure the prevalence of stunting in children aged 6-59 months
3. To determine the coverage of measles vaccination among children aged 12-59 months
4. To determine the coverage of vitamin A supplementation in the last 6 months among children aged 6-59 months
5. To assess the two-week period incidence of diarrhoea among children aged 6- 59 months
6. To measure the prevalence of stunting among school age children 5-19 years
7. To measure the prevalence of thinness among school age children 5-19 years
8. To measure the prevalence of anaemia in children aged 6-59 months and in women of reproductive age between 15-49 years (non-pregnant)
9. To measure the prevalence of anaemia among school age children 5-19 years
10. To investigate IYCF practices among children aged 0-23 months
11. To determine the coverage of ration cards and the duration the general food ration lasts for recipient households
12. To determine the extent to which negative coping strategies are used by households
13. To assess household dietary diversity

Secondary Objectives:

1. To assess the coverage of iron-folic acid supplementation in pregnant women.

3 Methodology

A cross-sectional survey was conducted targeting, African (Sudanese, Eritrean, Ethiopian and Somali) and Iraqi refugees focusing on women in the reproductive age group (15-49 years), under five children and schoolchildren (5-19 years).

The survey was conducted using the Standardized Monitoring and Assessment of Relief and Transitions (SMART) methodology to collect and analyse data on child anthropometry. Information on other indicators was collected and analysed using UNHCR's Standardised Expanded Nutrition Survey (SENS) Guidelines for Refugee Populations (Version 1.3, March 2012) (UNHCR / ENN / UCL, 2013)

3.1 Sample size

The sample size for children 6-59 months was calculated using ENA for SMART software (version 1). An up-to-date list of all households, with enough information to allow them to be located is available from UNHCR ProGres database; addresses and phone numbers.

Stratified simple random sampling was used to estimate a representative sample of households and children for the different studied nationalities .This type of sampling is the most appropriate for surveying refugees in urban setting. Sample size allocation was done using probability proportional to size (PPS)

The sample size was calculated based on the expected prevalence of GAM (10%), estimated desired precision (3%), proportion of children U5 (9%), and average household size (5), with a 10% allowance for non-response. However, the population of children U5 is less than 10,000 according to UNHCR ProGres database, so a correction factor in the sample size calculation was used. The resultant required sample size was 971 households and 354 children.

The desired number of households was selected randomly from the household list using the computer. The households were contacted by phone prior to data collection to inform them about the survey and verify their current location.

All eligible children aged 0-59 months from all selected households were included in the assessment of anthropometry, health and infant and young child feeding (0-23 months), and school aged children and adolescents (5-19 years). After invitation of the HH to come to the survey sites, the HH members turning up were verified by checking of UNHCR ID card to cross check the HH reporting members identity with the printed out lists of HH and the children of various age groups and women of reproductive age groups subject of the survey.

Table 4: Sample size calculation

Estimated GAM	Precision	Under 5 population	Average household size	NRR[1]	Sample size: children	Sample size: households
10.0%	3.0	9.0%	5	10.0%	354	971 including NRR

[1]Non-response rate

Table 5: Target and actual number captured

	Total population	% of the total population	Target No of under 5	Surveyed 6-59 months	Surveyed 0-23 months	Surveyed School age	Surveyed women
Sudan	31448	56.6	200	277	118	405	269
Ethiopia	6279	11.3	40	158	69	249	185
Eritrea	3541	6.4	23	63	24	139	87
Somalia	7190	12.9	46	70	29	58	68
Iraq	7134	12.8	45	33	16	71	41
Total	55592	100.0	354	601	256	922	650

The sample size for anaemia in children aged 6-59 was based on the sample size for GAM as recommended by the UNHCR Standardised Expanded Nutrition Survey (SENS) Guidelines when there is a need to assess the impact of an anaemia reduction intervention.

According to SENS guidelines, half of the selected households (486) should be selected for Food Security, and women anaemia measurements; however we included all the captured households for food security and anaemia measurement.

3.2 Sampling procedure: selecting households

A cross-sectional survey was conducted using stratified simple random sampling. The definition of the household in UNHCR ProGres is based on single unique case number given to each household, and this was the definition of the households that has been used in this nutrition survey.
An up-to-date list of all households, with addresses and phone is available from UNHCR ProGres database .New arrivals, as per ProGres data were also recognised in the sample size calculations.

A total of 605 households were captured. Given the large number of indicators it was estimated that no more than 15 households could be surveyed each day by one team.

3.3 Sampling procedure: selecting households and individuals

After getting the list of households to be included in the sample, a meeting with the interpreters (10 translators) was held and they were divided into 5 teams and were instructed to call the households and explain the purpose of the survey and give them appointment to any of the 4 survey sites (Refuge Egypt 6th October clinic, Sanabel clinic, Tadamon Maadi and Nasr city community Centre) as convenient to their residence. Finally we got 4 lists, one for each survey site. Interpreters were also instructed to call them again one day before the survey to confirm the appointment.

If a household (s) did not reply upon phone call, the teams were instructed to call again several times, also if an individual / household did not come on the same survey day after confirming participation in the research, the teams were instructed to call them, and either come on the same day or give them another appointment in either of the four survey sites. If they were unsuccessful after this, the individual/household was recorded as absent and was not replaced with another household/individual. If an individual/household refused to participate, then it was considered a refusal and the individual or the household was not

replaced with another. If a selected household was abandoned, the household was replaced by another. 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 disabled with a physical deformity preventing certain anthropometric measurements, the child was still included in the assessment of the other indicators. All this process was done under the full supervision of the survey Consultants with the support of UNHCR and its partners Refuge Egypt and Tadamon at the survey sites.

3.4 Questionnaires and measurement methods

Questionnaires

Four module specific questionnaires were designed to provide information on the relevant indicators for the different target groups, as indicated in the survey objectives and based on the standard SENS questionnaires. Another questionnaire was designed for the school age children and adolescents (see **Appendix 5** for all questionnaires). Questionnaires were prepared in English and administered in the language spoken by the household selected, via translators where necessary. All questionnaires were pre-tested before the survey.

- Questionnaires covered the four SENS modules and included the following areas and measurements:

    1) **Children 6-59 months (SENS Modules 1-2):** Anthropometric status, oedema, enrolment in selective feeding programmes ,immunisation (measles), vitamin A supplementation in last six months, morbidity from diarrhoea in past two weeks, haemoglobin assessment.

    2) **Children 0-23 months (SENS Module 3):** Questions on infant and young children feeding practices.

    3) **Women 15-49 years (SENS Module 2):** Pregnancy status, coverage of iron-folic acid pills and post-natal vitamin A supplementation, MUAC measurements for pregnant and lactating women (PLW), and haemoglobin assessment for non-pregnant women.

    4) **Food Security (SENS Module 4):** Access and use of the general food ration (GFR), coping mechanisms when the GFR ran out ahead of time and household food dietary diversity using the food consumption score.

- **Questionnaire for school age children and adolescents** : questions on education some food habits ,anthropometric status, and haemoglobin assessment

Measurement methods

Household level indicators

- **Food security:** The questionnaire was based on the standard SENS questionnaires.

Individual-level indicators

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

- **Birth date or age in months for children 0-59 months:** The exact date of birth (day, month, and year) was recorded from birth certificates. Either an EPI card or child health card were used to determine the age in case there was no birth certificate. If no reliable proof of age was available, age was estimated in months using a local event calendar or by comparing the selected child with a sibling whose ages were known, and was recorded in months on the questionnaire. If the child's age could absolutely not be determined by using a local events calendar or by probing, the child's length/height was measured and a cut off between 65 -110 cm was used for inclusion.

- **Age of women 15-49 years**: Reported age was recorded in years.

- **Weight of children 6-59 months & school age children 5-19 years:** Measurements were taken to the nearest 100 grams using an electronic scale (Stadiometer) with a wooden board to stabilise it on the ground. The double-weighing technique was used to weigh young children unable to stand on their own or unable to understand instructions not to move while on the scale. Clothes were removed during weighing although where necessary, light undergarments were allowed.

- **Age of school age children 5-19 years:** The exact date of birth (day, month, and year) was recorded from birth certificates. If no reliable proof of age was available, age was estimated in months using a local event calendar or by comparing the selected child with a sibling whose ages were known. If the child's age could not be absolutely determined by using a local events calendar or by probing we depend on the reporting from the father, mother or caregiver.

- **Height/Length of children 6-59 months & school age children 5-19 years:** Children's 6-59 months height or length was taken to the closest millimetre using a wooden height board. Height was used to decide on whether a child should be measured lying down (length) or standing up (height). Children less than 87cm were measured lying down, while children ≥ 87cm were measured standing up. The height of school age children 5 -19 years was measured using the Stadiometer.

- **Oedema in children 6-59 months:** The presence of bilateral oedema was determined by applying gentle thumb pressure on to the tops of both feet of the child for three seconds. If a shallow indent remained in both feet, oedema was recorded as present. The survey coordinators verified all oedema cases reported by the survey teams.

- **MUAC of children 6-59 months & school age children 5-19 years:** MUAC was measured at the mid-point of the left upper arm between the elbow and the shoulder and taken to the closest millimetre using standard tapes.

- **Measles vaccination in children 12-59 months:** Measles vaccination was assessed by checking for the measles vaccine on the EPI card or by carers recall if no EPI card was available. For ease of data collection, all children aged 6-59 months were assessed for measles but analysis was only done on children aged 12-59 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 an EPI card or health card if available, or by asking the caregiver to recall if no card was available. A vitamin A capsule was shown to the caregiver when asked to recall.

- **Haemoglobin (Hb) concentration in children 6-59 months ,school age children 5-**

16 years and women 15-49 years (non-pregnant): Hb concentration was taken from a capillary blood sample from the fingertip and recorded to the closest gram per decilitre by using the Mission Plus Hb testing device.

- **Diarrhoea in last 2 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 episodes of diarrhoea in the past two weeks.

- **ANC enrolment and iron and folic acid pills coverage in pregnant women:** Whether the woman was enrolled in the ANC programme and was receiving iron-folic acid pills was assessed by recall. An iron-folic acid pill was shown to the pregnant woman when asked to recall.

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

- **Referrals:** Children aged 6-59 months were referred to Caritas health centre for treatment when MUAC was <12.5cm, when oedema was present or when haemoglobin was <7.0g/dL. School age children were referred to treatment if haemoglobin was < 8.0 g/dl. Women of reproductive age were also referred to Caritas for treatment and further hospital care referral if haemoglobin was < 8.0 g/dl.

3.5 Case definitions, inclusion criteria and calculations

Malnutrition in children 6-59 months: Acute malnutrition was defined using weight-for-height index values or the presence of oedema and classified as shown in the table below. Main results are reported after analysis using the WHO 2006 Growth Standards. Results using the NCHS 1977 Growth Reference are reported in **Appendix 4**.

Table 6: 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-offs shown below. Main results are reported according to the WHO Growth Standards 2006. Results using the NCHS Growth Reference 1977 are reported in **Appendix 4**.

Table 7: 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)
Total 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. Results using the NCHS Growth Reference 1977 are reported in **Appendix 4**.

Table 8: 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)
Total 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 malnutrition according to the following cut-offs in children 6-59 months:

Table 9: MUAC malnutrition cut-offs in children 6-59 months

	Categories of MUAC values
Global acute malnutrition	<125 mm
Moderate acute malnutrition	≥ 115 mm and <125 mm
Severe acute malnutrition	< 115 mm

Table 10: Definitions of Thinness using BMI- for- age in children 5-19 years

Categories of thinness	Z-scores (WHO Growth Reference for school-aged children and adolescents)
Thin	<-2 z-scores and >=-3 z-scores
Severely thin	<-3 z-scores

Table 11: Definitions of underweight using Weight-for-age in children 5-10 years

Categories of underweight	Z-scores (WHO Growth Reference for school-aged children and adolescents)
Underweight	<-2 z-scores and >=-3 z-scores
Severely underweight	<-3 z-scores

Table 12: Definitions of stunting using Height-for-age in children 5-19 years

Categories of stunting	Z-scores (WHO Growth Reference for school-aged children and adolescents)
Stunted	<-2 z-scores and >=-3 z-scores
Severely stunted	<-3 z-scores

Table 13: Definitions of overweight using BMI-for-age in children 5-19 years

Categories of overweight	Z-scores (WHO Growth Reference for school-aged children and adolescents)
Overweight	>+1z score and ≤+2 z scores
Obese	>2 z-scores

Infant and young child feeding practices (IYCF) 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

$$\frac{\text{Children 0-23 months who were put to the breast within one hour of birth}}{\text{Children 0-23 months of age}}$$

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)

$$\frac{\text{Infants 0–5 months of age who received only breast milk during the previous day}}{\text{Infants 0–5 months of age}}$$

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

$$\frac{\text{Children 12–15 months of age who received breast milk during the previous day}}{\text{Children 12–15 months of age}}$$

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

$$\frac{\text{Infants 6–8 months of age who received solid, semi-solid or soft foods during the previous day}}{\text{Infants 6–8 months of age}}$$

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

$$\frac{\text{Children born in the last 24 months who were ever breastfed}}{\text{Children born in the last 24 months}}$$

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

$$\frac{\text{Children 20–23 months of age who received breast milk during the previous day}}{\text{Children 20–23 months of age}}$$

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, school age children 5-19 years, and women of reproductive age

Anaemia was classified according to the following cut-offs in children 6-59 months , school age children 5-19 years, and non-pregnant women of reproductive age. Pregnant women were not included in this surveys 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 14: Definition of anaemia: children 6-59 month and women of reproductive age (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

Table 15: Definition of anaemia: school age children 5-19 years (WHO 2011)

Children 5-11 years	<11.5	11.4 - 11.0	10.9 – 8.0	< 8.0
Children 12-14years	<12.0	11.9 –11.0	10.9 – 8.0	< 8.0
Children 15-19 years (females)	<12.0	11.9 –11.0	10.9 – 8.0	< 8.0
Children 15-19 years (males)	<13.0	12.9 –11.0	10.9 – 8.0	< 8.0

3.6 Classification of public health problems and targets

Anthropometric data: UNHCR Strategic Plan for Nutrition and Food Security (2008-2012) states that the target for the prevalence of global acute malnutrition (GAM) for children 6-59 months of age by country and region should be < 5% and the target for the prevalence of severe acute malnutrition (SAM) should be <1%. Table 9 shows the classification of public health significance of the anthropometric results for children under-5 years of age according to WHO.

Table 16: Classification of public health significance for children under 5 years of age (WHO 1995, 2000)

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

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

Vitamin A supplementation coverage: UNHCR Strategic Plan for Nutrition and Food Security (2008-2012) states that the 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 Table 13 below.

Table 17: Classification of public health significance (WHO 2000)

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

3.7Training, coordination and supervision

Survey teams and supervision

The survey was coordinated by two UNHCR members (Dr. Ashraf Azer, and Dr. Mona Attia) in coordination with two consultants from Faculty of Medicine of Ain Shams University (Prof. Mohamed Elawady and Prof. Amany Mokhtar).The UNHCR member Dr. Ashraf Azer provided additional technical and logistical support during part of the training and on all days of data collection.

A total of ten teams were recruited for data collection during the survey. Each team was composed of:

- 8-13 data collectors who fill the interview questionnaires, and worked alongside the translator(s). They were recently graduated physicians from Ain Shams Faculty of Medicine.
- 4-5 translators; those were recruited by the UNHCR; Tadamon field volunteers
- Two anthropometry measurers who measure ; weight , height (length) , MUAC , they were also recently graduated physicians from Ain Shams Faculty of Medicine
- 2 for haemoglobin measurement; one lab doctor and the other is a lab technician.
- 2 team leaders: they were staff members in the Faculty of Medicine of Ain Shams University. The team leaders were the reviewer for all questionnaires to ensure completeness and accuracy.
- Supervision of data collection was conducted on a daily basis by the two consultants (Prof. Mohamed Elawady and Prof. Amany Mokhtar), and the UNHCR member (Dr. Ashraf Azer)

Training

A four-day standardised training was conducted by the two consultants. The four days were allocated for the standardised survey training. Topics covered included the purpose and objectives of the survey; roles and responsibilities of each team member, familiarization with the questionnaires by reviewing the purpose for each question; interviewing skills and recording of data; age determination, anthropometric and haemoglobin measurements (including a practical standardisation test for both), This was followed by a one-day pilot test in which teams meet a minimum of 2-3 households and administered the questionnaires and performed the measurements. A feedback session

was held following the pilot to identify any areas of weakness and the data collection tools were reviewed.

3.8 Data collection

Data Collection

Data collection lasted 10 days from 16th -26th December 2015. Each survey team explained the purpose of the survey, confidentiality of the procedures and obtained verbal consent before continuing with the survey in the selected households (see **Appendix 5** for consent form). Each team was provided with a list of households to be surveyed on a daily basis. Data collection was done at the survey sites; Refuge Egypt 6th October clinic, Sanabel clinic, Tadamon Maadi and Nasr city community Centre. Haemoglobin assessment was done also at the same 4 sites. All teams were supported by 2 team leaders who were present at different points of data collection. During supervision in the field, and at the end of each day, team leaders manually checked the questionnaires for completeness, consistency and accuracy. This check was also used to provide feedback to the teams to improve data collection as the survey progressed.

3.9 Data analysis

Data entry was completed at the department of public health in the faculty of Medicine of Ain Shams University. All questionnaires were manually checked for completeness, consistency and range before data entry by the team leaders. This check was also used to provide feedback to the teams to improve data collection as the survey progressed.

Data for children 6-59 months were entered using ENA for SMART software (November 24, 2012 version). Data for children 0-23 months, school age children and adolescents 5-19 years women 15-49 years, and food security indicators were entered using SPSS Software (version 20). For school age children and adolescents 5-19 years the WHO AnthroPlus software for personal computers was used to derive the nutritional status in terms of weight-for-age, height-for-age and BMI-for-age z scores (WHO,2009).

Data entry was done by junior physicians at the department of public health in the faculty of Medicine of Ain Shams University. After completion of the survey data entry, all entries were double checked one by one with the original questionnaire to ensure there were no data entry errors.

Given that we are not in emergency and the study population was likely to be heterogeneous, with some sub-groups more badly affected than others. In situations such as this one, the use of the default +/- 3 SD cleaning window (the flexible cleaning criteria from the observed mean ;also known as SMART flags in the ENA for SMART software), is likely to lead to the exclusion of some true cases of severe acute malnutrition, so SMART flags were not excluded from analysis.

4. Results

The demographic characteristics of the population surveyed are presented in **Table 18**.

Table 18: Demographic characteristics of the study population

Total households surveyed	605
Total population surveyed	2230
Total U5 surveyed	658
Average household size	3.7
% of U5	29.5%

Table 19: Distribution of the studied sample by Nationality and gender

Age groups	Nationality												Gender					
	Sudanese		Ethiopian		Eritrean		Somali		Iraqis		Total		Males		Females		Total	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
6-59 months	277	46.1	158	26.3	63	10.5	70	11.6	33	5.5	601	100.0	328	54.8	270	45.2	598	100.0
15-49 years	269	41.4	185	28.5	87	13.4	68	10.5	41	6.3	650	100.0						
0-23 months	118	45.9	69	26.8	24	9.3	29	11.3	17	6.6	257	100.0	144	56.0	113	44.0	257	100.0
5-19 years	405	43.9	249	27.0	139	15.1	58	6.3	71	7.7	922	100.0	476	51.6	446	48.4	922	100.0

4.1 CHILDREN 6-59 MONTHS

4.1.1 Sample size

The number of children sampled was over the planned sample size of 354children.

Table 20: Target and actual number captured

	Target (No.)	Total surveyed (No.)	% of the target
Children 6-59 months	354	601	169.8

Table 21: Children 6-59 months - distribution of age and sex of sample

	Boys		Girls		Total		Ratio
AGE (mo)	**no.**	**%**	**no.**	**%**	**no.**	**%**	**Boy:girl**
6-17	84	57.9	61	42.1	145	24.1	1.4
18-29	91	58.3	65	41.7	156	26.0	1.4
30-41	63	53.4	55	46.6	118	19.6	1.1
42-53	64	48.5	68	51.5	132	22.0	0.9
54-59	28	56.0	22	44.0	50	8.3	1.3
Total	330	54.9	271	45.1	601	100.0	1.2

Age documentation was done for a total of 601 children between 6-59 months. The overall sex ratio was 1.2 and therefore within the recommended range (0.8-1.2). The highest age

group proportion among boys was between 18-29 months, and for girls between 42-53 months.

4.1.2 Anthropometric results (based on WHO Growth Standards 2006; NCHS Growth Reference 1977 shown in Appendix 3)

Table 22: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

	All n = 547	**Boys** n **=** 298	**Girls** n **=** 249
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(36) 6.6 % (4.8 - 9.0 95% C.I.)	(22) 7.4 % (4.9 - 10.9 95% C.I.)	(14) 5.6 % (3.4 - 9.2 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(25) 4.6 % (3.1 - 6.7 95% C.I.)	(16) 5.4 % (3.3 - 8.5 95% C.I.)	(9) 3.6 % (1.9 - 6.7 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(11) 2.0 % (1.1 - 3.6 95% C.I.)	(6) 2.0 % (0.9 - 4.3 95% C.I.)	(5) 2.0 % (0.9 - 4.6 95% C.I.)

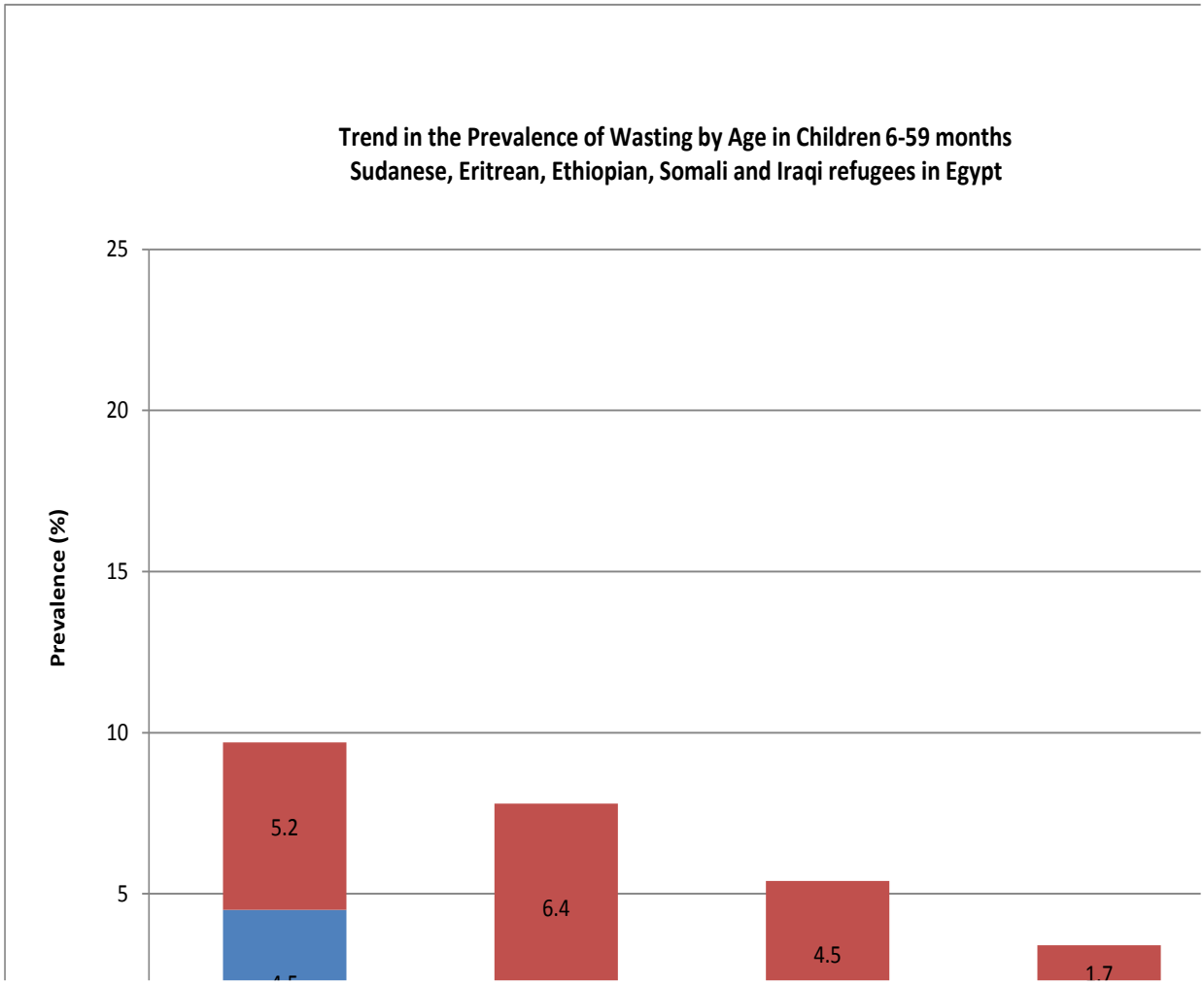
The prevalence of global malnutrition among the whole children between 6-59 months was 6.6% and higher in boys than girls. The prevalence of moderate malnutrition among all children was 4.6% and higher in boys than girls, while the prevalence of severe malnutrition was 2% among all children with no sex differences. It is worthy to state that the prevalence of oedema was 0.0 %.

Table 23: Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema

		Severe wasting (<-3 z-score)		**Moderate wasting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	134	6	4.5	7	5.2	121	90.3	0	0.0
18-29	141	2	1.4	9	6.4	130	92.2	0	0.0
30-41	110	1	0.9	5	4.5	104	94.5	0	0.0
42-53	119	2	1.7	2	1.7	115	96.6	0	0.0
54-59	43	0	0.0	2	4.7	41	95.3	0	0.0
Total	547	11	2.0	25	4.6	511	93.4	0	0.0

It has been found that severe acute malnutrition was highest among the age group 6-17 months while the age group 54-59 showed 0.0 prevalence. For moderate malnutrition, the highest percentage was among children 18-29 months and lowest in the age group 42-53 months. The prevalence of oedema was 0.0 %.

FIGURE 1: Trend in the prevalence of wasting by age in children 6-59 months



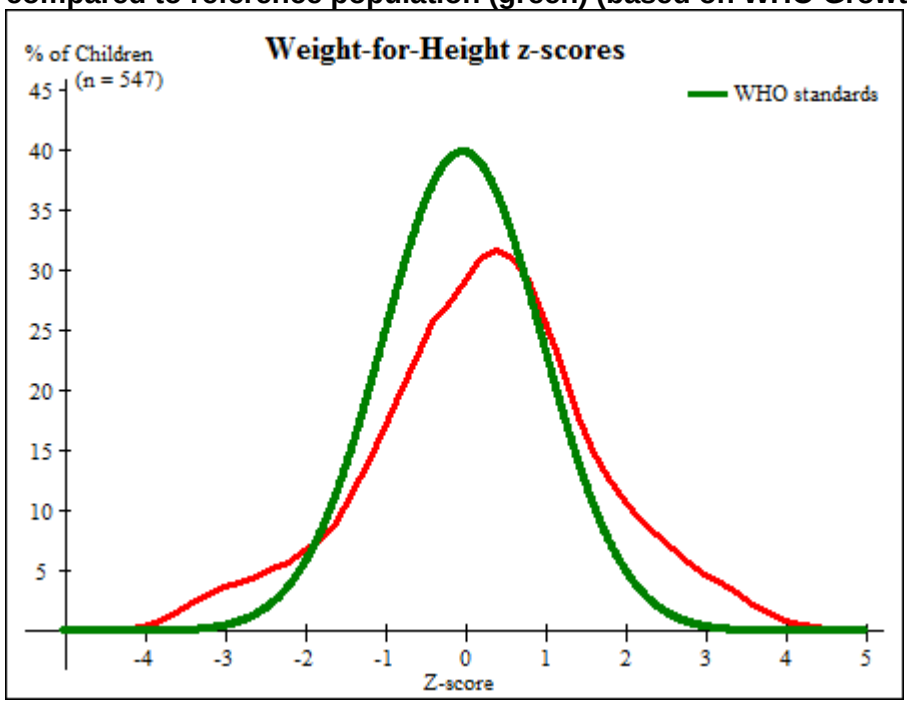
Moderate malnutrition was highest in the age group 18-29 months followed by age group 6-17 months then comes 54-59 months, 30-41 months and 42-53 months respectively. For severe malnutrition, the highest prevalence was found among 6-17 months followed by 42-53 months, 18-29 months and 30-41 months respectively.

Table 24: 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. 12 (2.2 %)	Not severely malnourished No. 539 (97.8 %)

No cases of Kwashiorkor or marasmic kwashiorkor were found among the studied children with no evidence of oedema, only 12 cases of marasmus were found representing 2.2%.

FIGURE 2: Distribution of weight-for-height z-scores of survey population (red) compared to reference population (green) (based on WHO Growth Standards)



MUAC is being used in the community for screening and admission to therapeutic and supplementary feeding programmes. It was found that the prevalence of acute malnutrition when measured by MUAC is less compared to WHZ.

Table 25: Prevalence of acute malnutrition based on MUAC cut off's (and/or oedema) and by sex

	All n = 556	**Boys** n = 305	**Girls** n = 251
Prevalence of global malnutrition (< 125 mm and/or oedema)	(8) 1.4 % (0.7 - 2.8 95% C.I.)	(6) 2.0 % (0.9 - 4.2 95% C.I.)	(2) 0.8 % (0.2 - 2.9 95% C.I.)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	(5) 0.9 % (0.4 - 2.1 95% C.I.)	(4) 1.3 % (0.5 - 3.3 95% C.I.)	(1) 0.4 % (0.1 - 2.2 95% C.I.)
Prevalence of severe malnutrition (< 115 mm and/or oedema)	(3) 0.5 % (0.2 - 1.6 95% C.I.)	(2) 0.7 % (0.2 - 2.4 95% C.I.)	(1) 0.4 % (0.1 - 2.2 95% C.I.)

According to MUAC, the prevalence of global, moderate and severe malnutrition was found to be higher among boys compared to girls.

Table 26: Prevalence of acute malnutrition by age, based on MUAC cut off's and/or oedema

		Severe wasting (< 115 mm)		Moderate wasting (>= 115 mm and < 125 mm)		Normal (> = 125 mm)		Oedema	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	138	1	0.7	3	2.2	134	97.1	0	0.0
18-29	143	1	0.7	2	1.4	140	97.9	0	0.0
30-41	112	0	0.0	0	0.0	112	100.0	0	0.0
42-53	118	0	0.0	0	0.0	118	100.0	0	0.0
54-59	45	1	2.2	0	0.0	44	97.8	0	0.0
Total	556	3	0.5	5	0.9	548	98.6	0	0.0

Using MUAC to measure acute malnutrition, it has been found that the severe wasting is highest among the age group 54-59 months and moderate wasting was highest among age group 6-17 months.

Table 27: Prevalence of underweight based on weight-for-age z-scores by sex

	All n = 554	**Boys** n = 302	**Girls** n = 252
Prevalence of underweight (<-2 z-score)	(36) 6.5 % (4.7 - 8.9 95% C.I.)	(18) 6.0 % (3.8 - 9.2 95% C.I.)	(18) 7.1 % (4.6 - 11.0 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(28) 5.1 % (3.5 - 7.2 95% C.I.)	(15) 5.0 % (3.0 - 8.0 95% C.I.)	(13) 5.2 % (3.0 - 8.6 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(8) 1.4 % (0.7 - 2.8 95% C.I.)	(3) 1.0 % (0.3 - 2.9 95% C.I.)	(5) 2.0 % (0.9 - 4.6 95% C.I.)

Applying the Z-scores cut off points showed that the prevalence of underweight; total, moderate and severe was higher among girls compared to boys. It is observed that the prevalence lies within the expected range.

Table 28: Prevalence of underweight by age, based on weight-for-age z-scores

		Severe underweight (<-3 z-score)		Moderate underweight (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	136	2	1.5	5	3.7	129	94.9	0	0.0
18-29	141	2	1.4	14	9.9	125	88.7	0	0.0
30-41	113	0	0.0	6	5.3	107	94.7	0	0.0
42-53	120	3	2.5	3	2.5	114	95.0	0	0.0
54-59	44	1	2.3	0	0.0	43	97.7	0	0.0
Total	554	8	1.4	28	5.1	518	93.5	0	0.0

Applying Z-scores revealed that severe underweight was highest among the age group 42-53 months, and moderate underweight was highest among 18-29 months group. No cases of oedema were recorded.

Table 29: Prevalence of stunting based on height-for-age z-scores and by sex

	All n = 558	**Boys** n **=** 304	**Girls** n **=** 254
Prevalence of stunting (<-2 z-score)	(55) 9.9 % (7.7 - 12.6 95% C.I.)	(33) 10.9 % (7.8 - 14.9 95% C.I.)	(22) 8.7 % (5.8 - 12.8 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(36) 6.5 % (4.7 - 8.8 95% C.I.)	(25) 8.2 % (5.6 - 11.9 95% C.I.)	(11) 4.3 % (2.4 - 7.6 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(19) 3.4 % (2.2 - 5.3 95% C.I.)	(8) 2.6 % (1.3 - 5.1 95% C.I.)	(11) 4.3 % (2.4 - 7.6 95% C.I.)

The prevalence of stunting as well as moderate stunting were higher among boys, while severe stunting was more prevalent among girls.

Table 30: Prevalence of stunting by age based on height-for-age z-scores

		Severe stunting (<-3 z-score)		**Moderate stunting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	138	4	2.9	8	5.8	126	91.3
18-29	144	7	4.9	15	10.4	122	84.7
30-41	111	5	4.5	6	5.4	100	90.1
42-53	121	3	2.5	5	4.1	113	93.4
54-59	44	0	0.0	2	4.5	42	95.5
Total	558	19	3.4	36	6.5	503	90.1

Based on height-for-age, severe and moderate stunting were higher in the age group 18-29 months. These findings are also evident in figure 3.

Figure 3: Trends in the prevalence of stunting by age in children 6-59 months

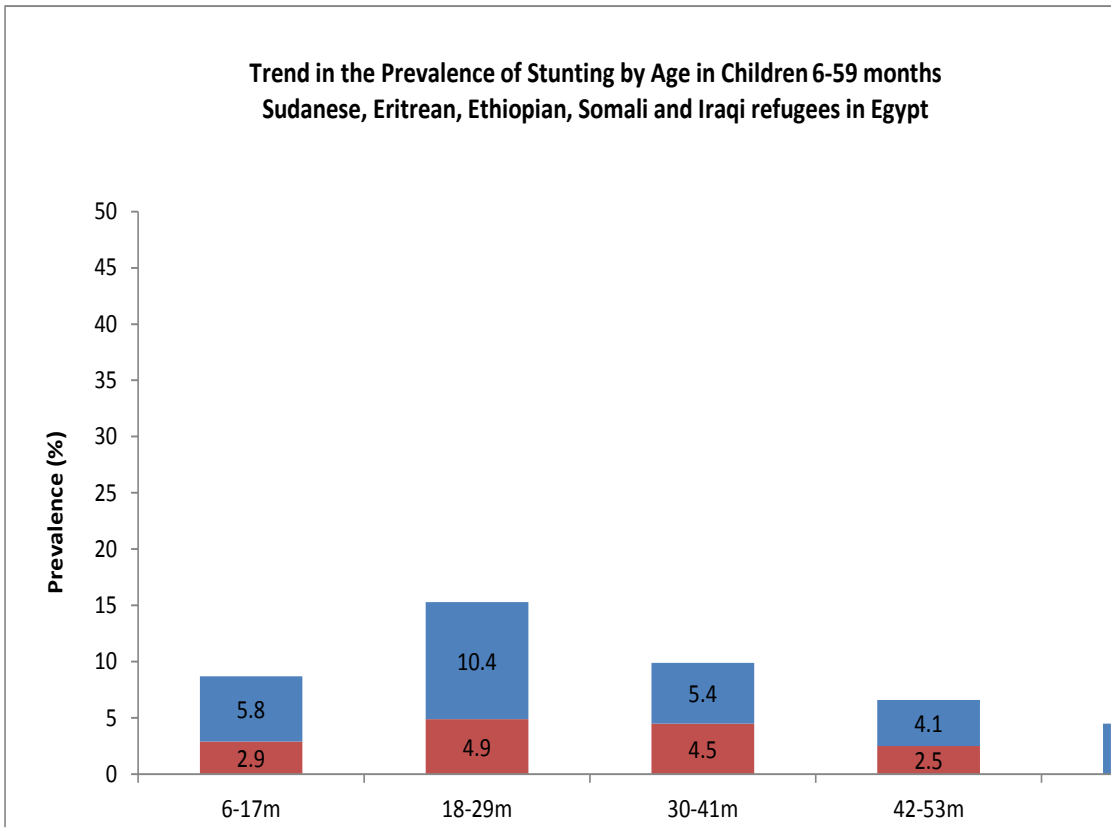
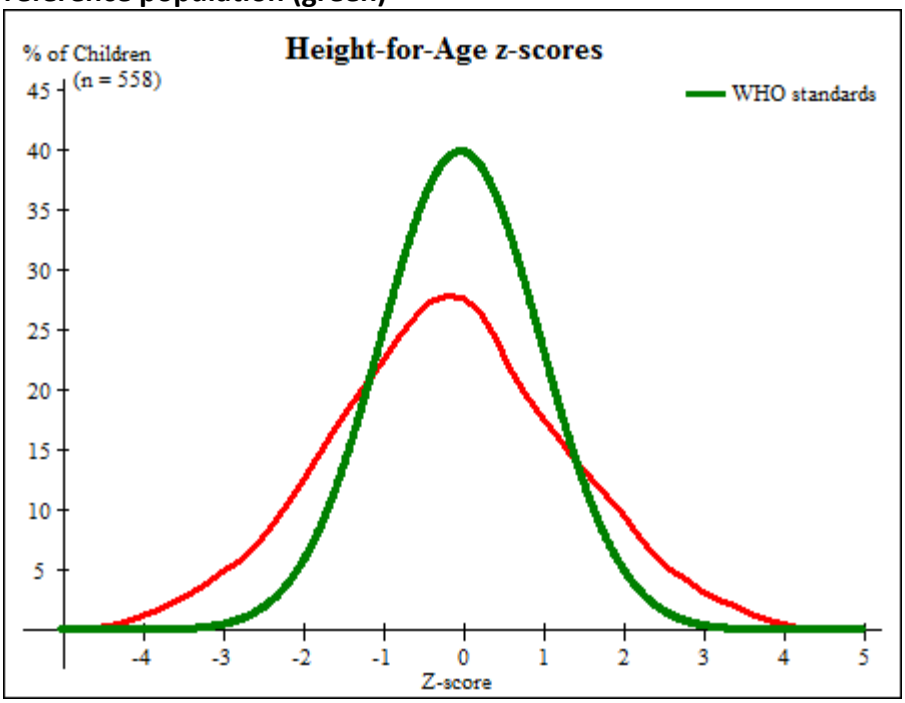


Figure 4: Distribution of height-for-age z-scores of survey population (red) compared to reference population (green)



The mean z-scores for acute malnutrition, stunting and underweight are presented in Table 31 below.

Table 31: 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	547	0.23±1.40	1.00	54	0
Weight-for-Age	554	0.08±1.29	1.00	47	0
Height-for-Age	558	-0.18±1.47	1.00	43	0

Table 32: Prevalence of overweight based on weight for height cut off's and by sex (no oedema)

	All n = 547	**Boys** n **=** 298	**Girls** n **=** 249
Prevalence of overweight (WHZ > 2)	(55) 10.1 % (7.8 - 12.9 95% C.I.)	(40) 13.4 % (10.0 - 17.8 95% C.I.)	(15) 6.0 % (3.7 - 9.7 95% C.I.)
Prevalence of severe overweight (WHZ > 3)	(15) 2.7 % (1.7 - 4.5 95% C.I.)	(11) 3.7 % (2.1 - 6.5 95% C.I.)	(4) 1.6 % (0.6 - 4.1 95% C.I.)

It was documented that the prevalence of overweight and severe overweight was higher among boys compared to girls.

Table 33: Prevalence of overweight by age, based on weight for height (no oedema)

		Overweight (WHZ > 2)		**Severe Overweight (WHZ > 3)**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**
6-17	134	13	9.7	6	4.5
18-29	141	22	15.6	3	2.1
30-41	110	13	11.8	4	3.6
42-53	119	4	3.4	1	0.8
54-59	43	3	7.0	1	2.3
Total	547	55	10.1	15	2.7

Documentation of overweight based on weight for height showed that overweight was highest among the age group 18-29 months, severe overweight was highest among 6-17 months age group.

4.1.3 Vaccination and vitamin A supplementation

Measles vaccination coverage results

Table 34: Measles vaccination coverage for children aged 12-59 months (n= 534)

	Measles (with card) n=87	**Measles (with card <u>or</u> confirmation from caregiver) n= 397**
YES	16.3% (8.5 -15.9 95% CI)	74.3% (56.9 -70.195% CI)

Measles vaccination coverage for children 12-59 months was very low when confirmed by card, and was still low when confirmed by care giver's recall.

Table 35: Vitamin A supplementation for children aged 6-59 months within past 6 months (n= 601)

	Vitamin A capsule (with card) n=50	Vitamin A capsule (with card or confirmation from caregiver) n=213
YES	8.3% (4.1-10.0 95% CI)	35.4% (26.6- 38.5 95% CI)

Vitamin A capsule supplementation was observed to be very low when confirmed either by card or care giver's recall.

4.1.4 Diarrhoea results

Table 36: Period prevalence of diarrhoea

	Number/total	% (95% CI)
Diarrhoea in the last two weeks	182/601	30.3 (28.9-39.7)

The results showed that 30.3% (95% CI 28.9-39.7) of surveyed children 6-59 months experienced diarrhoea in the two weeks prior to the survey which is considered to be high.

4.1.5 Anaemia in children 6-59 months

Table 37: Prevalence of anaemia and haemoglobin concentration in children 6-59 months of age (% 95% CI)

	6-59 n = 506	**6-23** n=192	**24-59** n=314
Total Anaemia a (Hb<11.0 g/dL)	76.3 (61.7-73.3)	81.8(62.3 - 79.9	72.9(57.4 -72.5)
Mild Anaemia (Hb 10.0-10.9 g/dL)	22.1 (18.5-28.7)	19.8(14.3 -30.1)	23.6(18.5-31.5)
Moderate Anaemia (7.0-9.9 g/dL)	46.0 (33.8-45.4)	47.9(33.9-51.9)	44.9(30.7- 45.0)
Severe Anaemia (<7.0 g/dL)	8.1 (3.3-7.7)	14.1(4.8 -13.6)	4.5(1.6 - 6.7)
Mean Hb (g/dL) (95% CI) [range]	10.1(9.9-10.3)	9.8(9.5- 10.2)	10.2(10.0-10.5)

It was revealed that the prevalence of total anaemia was highest among 6-23 months group, mild anaemia was highest among 24-59 months group, moderate and severe anaemia were highest among 6-23 months group.

4.2 CHILDREN 0-23 MONTHS

Table 38: Prevalence of infant and young child feeding practices indicators

Indicator	Age range	Number/ total	Prevalence (%)	95% CI
Timely initiation of breastfeeding	0-23 months	85/249	34.1	27.2 - 42.8
Exclusive breastfeeding under 6 months	0-5 months	14/56	24.6	12.3 - 42.6
Continued breastfeeding at 1 year	12-15 months	33/46	71.7	46.1-82.1
Continued breastfeeding at 2 years	20-23 months	13/37	35.1	19.9 - 63.7
Introduction of solid, semi-solid or soft foods	6-8 months	17/30	56.7	22.5 - 66.7
Consumption of iron-rich or iron-fortified foods	6-23 months	56/198	28.3	16.7 - 31.4
Bottle feeding	0-23 months	143/256	55.9	51.8 - 67.2

It is evident that some feeding practice indicators are considered to be very low e.g. timely initiation of breast feeding, exclusive breast feeding under 6 months, continued breast feeding till 2 years and consumption of iron rich foods.

Table 39: Infant formula intake in children aged 0-23 months

	Number/total	% 95% CI
Proportion of children aged 0-23 months who receive infant formula fortified or non-fortified	64/254	25.2% 26.3 - 41.9

The percentage of children below 24 months receiving infant formula fortified or non-fortified was low and below the confidence limit.

4.3 WOMEN OF REPRODUCTIVE AGE (15-49 YEARS)

4.3.1 Anaemia in non-pregnant women (15-49 years)

Table 40: 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)	All n = 519
Total Anaemia (<12.0 g/dL)	(271) 52.2% (47.7-56.6 95%CI)
Mild Anaemia (11.0-11.9 g/dL)	(124) 23.9% (20-27.7 95%CI)
Moderate Anaemia (8.0-10.9 g/dL)	(129) 24.9 % (21.2-29.1 95%CI)
Severe Anaemia (<8.0 g/dL)	(18) 3.5% (2.2-5.8 95%CI)
Mean Hb (g/dL) **(95% CI)** **[range]**	11.6 (g/dL) (11.4 -11.9 95%CI) [4.1,16.7]

It is documented that the prevalence of total anaemia among non-pregnant females is more than 52% which is considered to be very high.

Table 41: ANC enrolment and iron-folic acid pills coverage among pregnant women (15-49 years)

	Number /total	% (95% CI)
Currently enrolled in ANC programme	18/25	72% (49.0-85.1 95%CI)
Currently receiving iron-folic acid pills	15/25	60% (36.8-75.1 95%CI)

4.4 SCHOOL AGE CHILDREN AND ADOLESCENTS, 5-19 YEARS

Table 42 :Nationality of the sampled school age children and adolescents, 5-19 years

Nationality	Number/total	%
Sudanese	405/922	43.9
Eritrean	139/922	15.1
Ethiopian	249/922	27.0
Somali	58/922	6.3
Iraqis	71/922	7.7

The majority of the surveyed school age children and adolescents aged 5-19 years were Sudanese (43.9%), followed by the Ethiopian (27.0%).

Table 43: Age and sex distribution of the sampled school age children and adolescents, 5-19 years

Age groups (year)	Boys		Girls		Total		Ratio
	no.	%	no.	%	no.	%	Boy:girl
5 -11	294	52.6	265	47.4	559	60.9	1.1
12-14	100	54.6	83	45.4	183	19.9	1.2
15-19	81	46.0	95	54.0	176	19.2	0.9
Total	475	51.7	443	48.3	918	100.0	1.1

A similar number of boys and girls were surveyed. The children above 11 years of age were slightly under-represented as compared to children 5-11 years of age.

Table 44: Distribution of the sampled school age children and adolescents, 5-19 years according to school enrollment

Age groups (year)	Boys				Girls				Total			
	Yes		NO		Yes		No		Yes		No	
	no	%	no	%	no	%	no	%	No	%	no	%
5 -11	209	71.1	85	28.9	197	74.3	68	25.7	406	72.6	153	27.4
12-14	75	75.0	25	25.0	65	78.3	18	21.7	140	76.5	43	23.5
15-19	55	67.9	26	32.1	62	65.3	33	34.7	117	66.5	59	33.5
Total	339	71.4	136	28.6	324	73.1	119	26.9	663	72.2	225	27.8

Nearly one third of the surveyed boys and girls were not enrolled in school; however the age group 15-19 years of age showed slightly higher percentage of school enrollment.

Table 45: Distribution of the sampled school age children and adolescents, 5-19 years according to some food habits

	Number/total	%
Daily breakfast		
Yes	467/908	51.4
No	441/908	48.6
Fast food consumption		
Daily	33/903	3.7
Weekly	96/903	10.6
Monthly	95/903	10.5
Never	67903	75.2

Nearly half of the surveyed school age children and adolescents did not take breakfast daily, on the other hand, 75.2% never consumed fast food

Table 46: Prevalence of thinness based on BMI for age z-scores and by sex among school age children and adolescents 5-19 years.

	All n = 845	**Boys** n **= 437**	**Girls** n **=408**
Prevalence of thinness (<-2 z-score)	(88) 10.4% (8.2-14.9 95% C.I.)	(49) 11.2% (7.5-15.3 95% C.I.)	(39) 9.6% (7.4-17.4 95% C.I.)
Prevalence of severe thinness (<-3 z-score)	(45) 5.3% (3.8 - 9.3 95% C.I.)	(24) 5.5% (2.6-7.3 95% C.I.)	(21) 5.1% (4.2-13.2 95% C.I.)

The prevalence of thinness and sever thinness among boys was slightly higher than the prevalence among girls.

Table 47: Prevalence of stunting based on height-for-age z-scores and by sex among school age children and adolescents 5-19 years.

	All n = 845	**Boys** n **= 437**	**Girls** n **= 408**
Prevalence of stunting (<-2 z-score)	(47) 5.6% (3.8-8.1 95% C.I.)	(26) 5.9%(3.8-9.8 95% C.I.)	(21) 5.1%(2.9-8.5 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(16) 1.9% (0.9-3.1 95% C.I.)	(10) 2.3% (1.0-4.5 95% C.I.)	(6) 1.5% (0.4-3.6 95% C.I.)

The prevalence of stunting and sever stunting among boys was slightly higher than the prevalence among girls.

Table 48: Prevalence of underweight based on weight for age z-scores and by sex among school age children and adolescents 5-10 years.

	All n = 455	**Boys** n **=** 241	**Girls** n **=** 214
Prevalence of underweight (<-2 z-score)	(13) 2.9% (1.1-4.3 95% C.I.)	(7) 2.9 % (0.9-5.0 95% C.I.)	(6) 2.8 % (0.7-6.7 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(11) 2.4 % (1.6-7.2 95% C.I.)	(4) 1.7 % (0.5-5.6 95% C.I.)	(7) 3.3 % (2.0-12.9 95% C.I.)

The prevalence of underweight was nearly similar among boys among girls however; severe underweight was nearly doubled among girls of the same age group.

Table 49: Prevalence of overweight based on BMI for age cut offs and by sex among school age children and adolescents 5-19 years. (no oedema)

	All n = 845	**Boys** n **=** 437	**Girls** n **=** 408
Overweight (>+1z-score and ≤+2 z scores)	(121) 14.3 % (11.4 – 17.3 95% C.I.)	(55) 12.6 % (8.4-15.7 95% C.I.)	(66) 16.2 % (13.2-21.7 95% C.I.)
Obese (>2 z-scores)	(71) 8.4 % (6.5 – 13.2 95% C.I.)	(34) 7.8 % (5.3-13.5 95% C.I.)	(37) 9.1 % (6.8-15.1 95% C.I.)

It was documented that the prevalence of overweight and severe overweight was higher among girls compared to boys.

Table 50: Prevalence of anaemia and haemoglobin concentration among school age children and adolescents (5-11years)

Anaemia 5-11 years	All n=477	% (95% CI)
Total Anaemia (Hb <11.5 g/dl)	254	53.2% (39.4 -51.5 95% CI)
Mild (Hb 11-11.4)	64	13.4% (10.1 -17.8 95% CI)
Moderate (Hb 8-10.9)	183	38.4% (25.2 -36.0 95% CI)
Severe (Hb <8)	7	1.5% (0.6 -3.8 95% CI)
Mean Hb (g/dL)	11.5(11.2-11.7 95% CI)	

Among school age children and adolescents (5-11years), more than 50% had anaemia, with 38.4% had moderate anemia and 1.5% had severe anaemia.

Table 51: Prevalence of anaemia and haemoglobin concentration among school age children and adolescents (12-14 years)

Anaemia 12-14years	All n=146	% (95% CI)
Total Anaemia (Hb <12 g/dl)	84	57.5% (40.3 - 60.2 95% CI)
Mild (Hb 11-11.9)	36	24.7%(14.4 - 31.6 95% CI)
Moderate (Hb 8-10.9)	46	31.5% (18.9 - 36.3 95% CI)
Severe (Hb <8)	2	1.4% (0.3 - 8.7 95% CI)
Mean Hb (g/dL)	11.8 (11.5-12.2 95% CI)	

It was documented that 57.5% of children aged 12-14 years had anaemia which is considered very high.

Table 52: Prevalence of anaemia and haemoglobin concentration among school age children and adolescents 15-19 years (females)

Anaemia 15-19 years (females)	All n=78	% (95% CI)
Total Anaemia (Hb <12 g/dl)	30	38.5% (27.3 - 53.0 95% CI)
Mild (Hb 11-11.9)	12	15.4% (9.1 - 26.8 95% CI)
Moderate (Hb 8-10.9)	16	20.5% (11.5 - 31.7 95% CI)
Severe (Hb <8)	2	2.6%(0.9 - 13.9 95% CI)
Mean Hb (g/dL)	12.2(11.6-12.8 95% CI)	

The prevalence of anaemia among females aged 15-19 years was 38.5 which is also considered high.

Table 53: Prevalence of anaemia and haemoglobin concentration among school age children and adolescents 15-19 years (males)

Anaemia 15-19 years (males)	All n=56	% (95% CI)
Total Anaemia (Hb <13 g/dl)	22/56	39.3% (16.0 - 49.5)
Mild (Hb 11-12.9)	12/56	21.4% (8.4 - 43.0)
Moderate (Hb 8-10.9)	10/56	17.9% (4.4 - 18.7)
Severe (Hb <8)	0/56	
Mean Hb (g/dL)	13.1(12.5-13.7 95% CI)	

The prevalence of anaemia among males aged 15-19 years was 39.3 which is slightly higher than females of the same age group.

4.5 FOOD SECURITY

4.5.1 Food distribution results

Data was collected on the last food distribution prior to data collection. It should be noted that it was not a GFR and it was targeted distribution for the well-baby and well-child clinics children beneficiaries and not all under five years children and is done as a food ration distribution on monthly basis. Coverage was very low at 26.9% (**Table 54**), however the ration only lasted 18.3% of the intended 30 day duration (**Table 55**).

Table 54: Ration card coverage

	Number/total	% (95% CI)
Proportion of households with a ration card	163/605	26.9%(30.2-38.3 95% CI)

Table 55: Reported duration of food ration

Average number of days general food ration lasts out of 30 days (mean, 95% CI)	**Average duration (%) in relation to the theoretical duration of the ration***
5.5 (3.6 -7.3)	18.3%

4.5.2 Negative household coping strategies

Table 56: Coping strategies used by the surveyed population over the past month

	Number/ total	% (95% CI)
Proportion of households reporting using the following coping strategies over the past month*:		
Borrowed cash, food or other items with or without interest	415/604	68.7(66.5 -74.3)
Sold any assets that would not have normally sold (furniture, seed stocks, tools, other NFI, livestock etc.)	125/605	20.7 (14.6 -20.7)
Requested increased remittances or gifts as compared to normal	351/603	58.2(55.3 - 63.8)
Reduced the quantity and/or frequency of meals and snacks	475/600	79.2 (77.9 - 84.4)
Begged	52/605	8.6 (6.4 - 11.3)
Engaged in potentially risky or harmful activities	31/605	5.1(3.3 - 7.0)
Proportion of households reporting using none of the coping strategies over the past month	28/597	4.7 (2.6 - 5.9)

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

4.5.3 Household dietary diversity results

Household dietary diversity is a useful proxy for dietary intake and household food access. The mean household dietary diversity score (HDDS) was low at 5.6 out of a total of 12 food groups (**Table 57**), indicating that the majority of the households surveyed had poor dietary diversity. The most common food groups consumed in the 24 hours before the survey were cereals (97.7%), oils/fats (85.3%), vegetables (68.8%) and legumes or nuts (50.2%). This means that households are consuming less than half of the total number of food groups (**Table 58**).

Analysis was conducted on consumption of micronutrient rich foods (**Table 59**).

Consumption of high protein foods was low; >80% of households did not eat any flesh foods in the previous 24 hours, as was consumption of vegetables, fruits, meat, eggs, fish/seafood, and milk/milk products.

Table 57: Average HDDS*

	Mean(95% CI)
Average HDDS	5.6 (5.4 - 5.7)

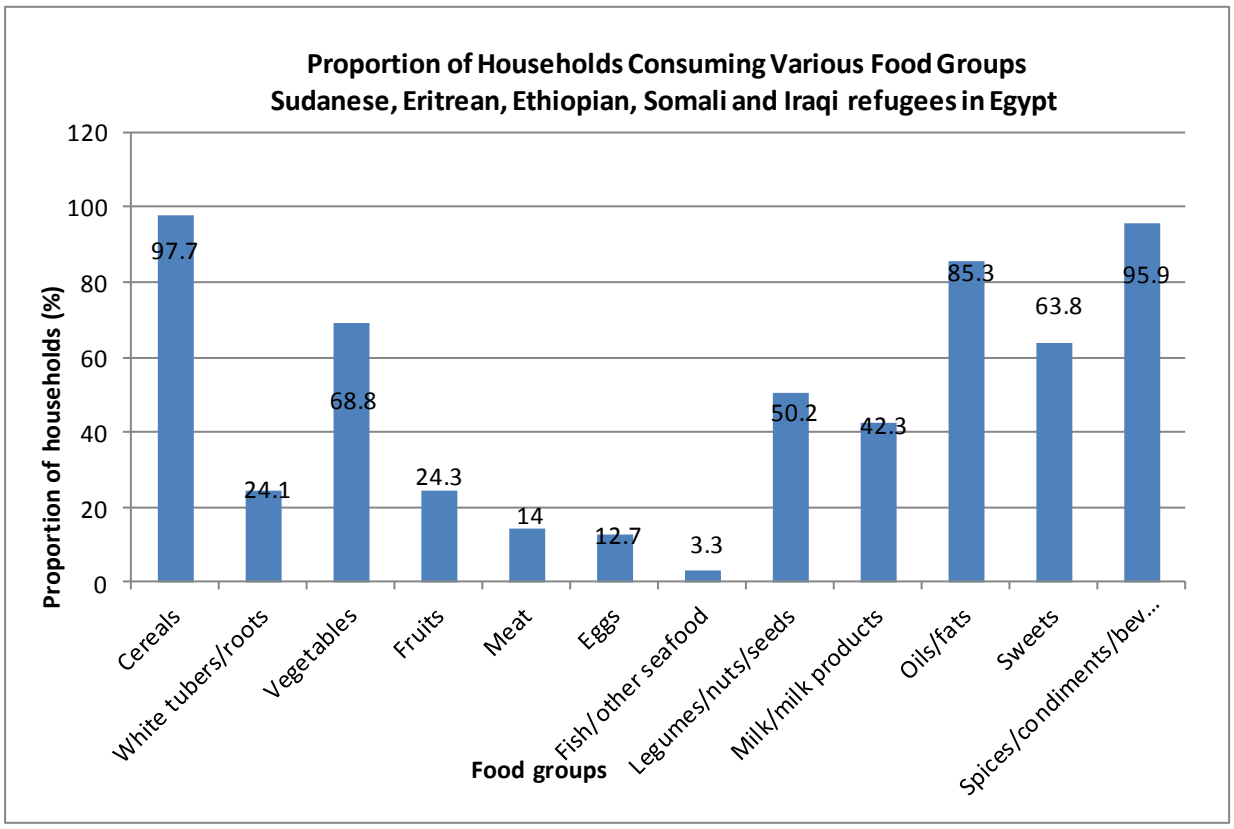
* Maximum HDDS is 12.

Table 58: Consumption of micronutrient rich foods by households

	Number/total	% (95% CI)
Proportion of households *not consuming any* vegetables, fruits, meat, eggs, fish/seafood, and milk/milk products	119/605	19.7(18.3 - 25.6)
Proportion of households consuming either a plant or animal source of vitamin A	326/605	53.9 (43.9 - 52.3)
Proportion of households consuming organ meat/flesh meat, or fish/seafood (food sources of haem iron)	98/605	16.2 (9.8 - 14.7)

Figure 5: proportion of households consuming different food groups within last 24 hours

-



4.6 RESULTS FOR THE DIFFERENT NATIONALITIES

Table 59: Age and sex distribution of the participants' nationalities

	Sudanese		Ethiopian		Eritrean		Somali		Iraqi	
	Boys n=154	Girls n=123	Boys n=90	Girls n=68	Boys n=30	Girls n=33	Boys n=41	Girls n=29	Boys n=15	Girls n=18
AGE (mo)	%	%	%	%	%	%	%	%	%	%
6-17	54.7	45.3	63.9	36.1	53.8	46.2	47.8	52.2	57.1	42.9
18-29	62.5	37.5	58.3	41.7	43.8	56.3	53.8	46.2	45.5	54.5
30-41	54.5	45.5	53.3	46.7	35.7	64.3	50.0	50.0	66.7	33.3
42-53	47.6	52.4	52.6	47.4	53.8	46.2	46.7	53.3	20.0	80.0
54-59	60.0	40.0	55.6	44.4	57.1	42.9	42.9	57.1	25.0	75.0
Total	55.6	44.4	57.0	43.0	47.6	52.4	48.6	51.4	45.5	54.5

The sex ratio (M/F) of the participants ranged from 2:1 among the Iraqi to 1: 1.9 among Somali participants. The highest percent of older boys (54-59 months) was among Sudanese (66.7%), while the highest percent of younger boys (6-17 months) was among Ethiopian (66.7%). As regard the participants' girls, the highest percent of older girls was among Eritrean participants (71.4%), while the highest percent of younger girls was among the Somali girls (52.2%). (Table 59)

Table 60: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

	Sudanese		Ethiopian		Eritrean		Somali		Iraqi	
	Boys n = 139	**Girls n =** 109	**Boys n = 83**	**Girls n = 65**	**Boys n = 30**	**Girls n = 32**	**Boys n = 31**	**Girls n = 25**	**Boys n = 15**	**Girls n = 18**
	%(95% CI)	**%**(95% CI)	**%**(95% CI)	**%** (95% CI)	**%**(95% CI)	**%** (95%CI)	**%** (95% CI)	**%** (95% CI)	**%**(95% CI)	**%**(95% CI)
Prevalence of global malnutrition (<-2 z-score and/or oedema)	9.4 % (5.5 - 15.3)	2.8 % (0.9 - 7.8)	7.2 % (3.4 - 14.9)	4.6 % (1.6 - 12.7)	3.3 % (0.6 - 16.7)	15.6 % (6.9 - 31.8)	6.5 % (1.8 - 20.7)	12.0 % (4.2 - 30.0.)	0.0 % (0.0 - 20.4)	0.0 % (0.0 - 17.6)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	5.8 % (2.9 - 10.9)	0.9 % (0.2 - 5.0)	6.0 % (2.6 - 13.3)	3.1 % (0.8 - 10.5)	3.3 % (0.6 - 16.7)	12.5 % (5.0 - 28.1)	6.5 % (1.8 - 20.7.)	8.0 % (2.2 - 25.0)	0.0 % (0.0 - 20.4)	0.0 % (0.0 - 17.6)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	3.6 % (1.5 - 8.1)	1.8 % (0.5 - 6.4)	1.2 % (0.2 - 6.5)	1.5 % (0.3 - 8.2)	0.0 % (0.0 - 11.4)	3.1 % (0.6 - 15.7)	0.0 % (0.0 - 11.0)	4.0 % (0.7 - 19.5)	0.0 % (0.0 - 20.4)	0.0 % (0.0 - 17.6)

Table 60, shows the prevalence of acute malnutrition among the studied participants based on weight-for-height z-scores. As regard the global malnutrition, the prevalence ranged from 0.0% to 9.4% among boys and from 0.0% to 15.6% among girls. The highest prevalence was among the Sudanese boys (9.4%) followed by the Ethiopian one (7.2%) and the least prevalence was among Iraqi boys (0.0%). For girls, the highest prevalence was among the Eritrean girls (15.6%), followed by the Somali girls (12.0%) and the least prevalence was among Iraqi girls (0.0%).Sever malnutrition was higher among Somali girls (4.0%) followed by Sudanese boys (3.6%)

Table 61: Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema*

	Sudanese n=248			Ethiopian n=148			Eritrean n=62			Somali n=56			Iraqi n=33		
	Severe wasting n=7	Mod. wasting n=9	Normal n=232	Severe wasting n=2	Mod. wasting n=7	Normal n=139	Severe wasting n=1	Mod. wasting n=5	Normal n=56	Severe wasting n=1	Mod. wasting n=4	Normal n=51	Severe wasting n=0	Mod. wasting n=0	Normal n=33
Age (mo)	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**%)**	**(%)**	**(%)**	**(%)**
6-17	6.6	4.9	88.5	5.9	5.9	88.2	0.0	0.0	100.0	0.0	10.5	89.5	0.0	0.0	100.0
18-29	2.9	4.3	92.8	0.0	8.6	91.4	0.0	12.5	87.5	0.0	10.0	90.0	0.0	0.0	100.0
30-41	0.0	0.0	100.0	0.0	7.7	92.3	0.0	21.4	78.6	8.3	0.0	91.7	0.0	0.0	100.0
42-53	1.8	3.6	94.5	0.0	0.0	100.0	8.3	0.0	91.7	0.0	0.0	100.0	0.0	0.0	100.0
54-59	0.0	9.1	90.9	0.0	0.0	100.0	0.0	0.0	100.0	0.0	20.0	80.0	0.0	0.0	100.0
Total	2.8	3.6	93.5	1.4	4.7	93.9	1.6	8.1	90.3	1.8	7.1	91.1	0.0	0.0	100.0

*Severe wasting (<-3 z-score), Moderate wasting (>= -3 and <-2 z-score), Normal (> = -2 z score)

Table (61) shows the prevalence of acute malnutrition according to age groups. As regard sever wasting, the highest prevalence (8.3%) was observed among Somali and Eritrean participants aged (30-41 months) and (42-53 months) respectively. For Sudanese and Ethiopian children the highest prevalence was among the younger age group (6-17 months) with a rate of 6.6% and 5.9% respectively. The highest prevalence of moderate wasting was observed among Eritrean participants (21.4%) in the age group (30 – 41months) and (20 %) among older Somali participants aged 54-59 months. None of the Iraqi participants suffered from wasting.

Table 62: Distribution of acute malnutrition and oedema based on weight-for-height z-scores*

	Sudanese		Ethiopian		Eritrean		Somali		Iraqi	
	<-3 z-score	**>=-3 z-score**	**<-3 z-score**	**>=-3 z-score**	**<-3 z-score**	**>=-3 z-score**	**<-3 z-score**	**>=-3 z-score**	**<-3 z-score**	**>=-3 z-score**
	Marasmic	Not severely malnourished	**Marasmic**	Not severely malnourished	**Marasmic**	Not severely malnourished	**Marasmic**	Not severely malnourished	**Marasmic**	Not severely malnourished
No. (%)	8 (3.2 %)	242 (96.8 %)	2 (1.4 %)	146 (98.6 %)	1 (1.6 %)	62 (98.4 %)	1 (1.8 %)	56 (98.2 %)	0 (0.0%)	100 (100%)

* The prevalence of oedema is 0.0 %

Table 62 shows the prevalence of marasmus at all the studied nationalities. The highest prevalence of Marasmus was observed among the Sudanese participants (3.2%), while the lowest was among Iraqi (0.0%).

Table 63: Prevalence of acute malnutrition based on MUAC cut offs (and/or oedema) and by sex

	Sudanese		Ethiopian		Eritrean		Somali		Iraqi	
	Boys n = 144	Girls n = 109	Boys n =85	Girls n = 67	Boys n = 28	Girls n = 30	Boys n = 33	Girls n = 27	Boys n = 15	Girls n = 18
	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95%CI)	% (95%CI)	% (95% CI)	% (95% CI)	% (95% CI)
Prevalence of global malnutrition (< 125 mm and/or oedema)	3.5 % (1.5 - 7.9)	1.8 % (0.5-6.4)	0.0 % (0.0- 4.3)	0.0 % (0.0- 5.4)	3.6 % (0.6 - 17.7)	0.0 % (0.0 - 11.4)	0.0 % (0.0 - 10.4)	0.0 % (0.0 - 12.5)	0.0 % (0.0 - 20.4)	0.0 % (0.0 - 17.6)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	2.8 % (1.1 – 6.9)	0.9 % (0.2 – 5.0	0.0 % (0.0- 4.3)	0.0 % (0.0- 5.4)	0.0 % (0.0- 12.1)	0.0 % (0.0 - 11.4)	0.0 % (0.0 - 10.4)	0.0 % (0.0 - 12.5)	0.0 % (0.0 - 20.4)	0.0 % (0.0 - 17.6)
Prevalence of severe malnutrition (< 115 mm and/or oedema)	0.7 % (0.1 – 3.8)	0.9 % (0.2- 5.0)	0.0 % (0.0- 4.3)	0.0 % (0.0- 5.4)	3.6 % (0.6- 17.7)	0.0 % (0.0 - 11.4)	0.0 % (0.0 - 10.4)	0.0 % (0.0 - 12.5)	0.0 % (0.0 - 20.4)	0.0 % (0.0 - 17.6)

Table 63, shows the prevalence of acute malnutrition among the studied participants based on MUAC cut off. It was documented that, Sudanese boys and girls and Eritrean boys suffered from acute malnutrition based on MUAC cut off; 3.6%, 3.5% among Eritrean and Sudanese boys respectively and 1.8% among Sudanese girls.

Table 64: Prevalence of acute malnutrition by age, based on MUAC cut offs and/or oedema

	Sudanese			Ethiopian			Eritrean			Somali			Iraqi		
	Severe wasting n=2	Mod. wasting n=5	Normal n=246	Severe wasting n=0	Mod. wasting n=0	Normal n=152	Severe wasting n=1	Mod. wasting n=0	Normal n=57	Severe wasting n=0	Mod. wasting n=0	Normal n=60	Severe wasting n=0	Mod. wasting n=0	Normal n=33
Age (mo)	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**
6-17	1.6	4.8	93.7	0.0	0.0	100.0	0.0	0.0	100.0	0.0	0.0	100.0	0.0	0.0	100.0
18-29	0.0	2.8	97.2	0.0	0.0	100.0	7.1	0.0	92.9	0.0	0.0	100.0	0.0	0.0	100.0
30-41	0.0	0.0	100.0	0.0	0.0	100.0	0.0	0.0	100.0	0.0	0.0	100.0	0.0	0.0	100.0
42-53	0.0	0.0	100.0	0.0	0.0	100.0	0.0	0.0	100.0	0.0	0.0	100.0	0.0	0.0	100.0
54-59	8.3	0.0	91.7	0.0	0.0	100.0	0.0	0.0	100.0	0.0	0.0	100.0	0.0	0.0	100.0
Total	0.8	2.0	97.2	0.0	0.0	100.0	1.7	0.0	98.3	0.0	0.0	100.0	0.0	0.0	100.0

*Severe wasting (< 115 mm), Moderate wasting (>= 115 mm and < 125 mm), Normal (> = 125 mm)

Table 64, shows the prevalence of acute malnutrition based on MUAC cut off according to age groups. As regard sever wasting, the highest prevalence was observed in the oldest age group (54-59 months) among Sudanese participants by 8.3 %, while it was observed at a younger age group (18-29 months) among the Eritrean (7.1%). Moderate wasting was observed only among Sudanese in the age group (6-17 months) by (4.8%) and (18-29 months) by 2.8%.

Table 65: Prevalence of underweight based on weight-for-age z-scores by sex

	Sudanese		Ethiopian		Eritrean		Somali		Iraqi	
	Boys n **= 142**	**Girls** n **= 110**	**Boys** n **= 84**	**Girls** n **= 66**	**Boys** n **= 30**	**Girls** n **= 32**	**Boys** n **=31**	**Girls** n **=26**	**Boys** n **= 15**	**Girls** n **=18**
	% 95% CI	**% 95% CI**	**% 95% CI**	**% 95% CI**	**% 95% CI**	**% 95% CI**	**% 95% CI**	**% 95% CI**	**% 95% CI**	**% 95% CI**
Prevalence of underweight (<-2 z-score)	8.5 % (4.9- 14.2)	4.5 % (2.0- 0.2)	3.6 % (1.2- 10.0)	12.1 % (6.3 - 22.1)	6.7 % (1.8- 21.3)	9.4 % (3.2- 24.2)	3.2 % (0.6 - 16.2)	3.8 % (0.7- 18.9)	0.0 % (0.0- 20.4)	5.6 % (1.0- 25.8)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	6.3 % (3.4 – 11.6	3.6 % (1.4- 9.0)	3.6 % (1.2- 10.0)	9.1 % (4.2- 18.4)	6.7 % (1.8 - 21.3)	3.1 % (0.6 - 15.7)	3.2 % (0.6 - 16.2)	3.8 % (0.7 - 18.9)	0.0 % (0.0 - 20.4)	5.6 % (1.0 - 25.8)
Prevalence of severe underweight (<-3 z-score)	2.1 % (0.7 - 6.0)	0.9 % (0.2- 5.0)	0.0 % (0.0- 4.4)	3.0 % (0.8- 10.4)	0.0 % (0.0 - 11.4)	6.3 % (1.7 - 20.1)	0.0 % (0.0 - 11.0)	0.0 % (0.0 - 12.9)	0.0 % (0.0 - 20.4)	0.0 % (0.0 - 17.6)

Table 65 shows the prevalence of malnutrition based on weight-for-age z-scores by sex. It was documented that, Ethiopian and Eritrean girls followed by Sudanese girls had the highest prevalence of underweight (12.1%, 9.4% and 8.5% respectively). In addition the prevalence of sever underweight was higher among Eritrean girls (6.3%) followed by Ethiopian girls(3.0%) and Sudanese boys (2.1%).

Table 66: Prevalence of underweight by age, based on weight-for-age z-scores*

	Sudanese n=252			Ethiopian n=150			Eritrean n=62			Somali n=57			Iraqi n=33		
	Severe under weight n=4	Moderate under weight n=13	Normal n=235	Severe under weight n=2	Moderate under weight n=9	Normal n=139	Severe under weight n=2	Moderate under weight n=3	Normal n=57	Severe under weight n=0	Moderate under weight n=2	Normal n=55	Severe under weight n=0	Moderate under weight n=1	Normal n=32
Age (mo)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
6-17	1.6	6.5	91.9	2.9	2.9	94.1	0.0	0.0	100.0	0.0	0.0	100.0	0.0	0.0	100.0
18-29	1.4	10.1	88.4	0.0	11.4	88.6	6.3	6.3	87.5	0.0	20.0	80.0	0.0	0.0	100.0
30-41	0.0	1.9	98.1	0.0	7.1	92.9	0.0	14.3	85.7	0.0	0.0	100.0	0.0	16.7	83.3
42-53	1.8	1.8	96.4	2.7	5.4	91.9	8.3	0.0	91.7	0.0	0.0	100.0	0.0	0.0	100.0
54-59	8.3	0.0	91.7	0.0	0.0	100.0	0.0	0.0	100.0	0.0	0.0	100.0	0.0	0.0	100.0
Total	1.6	5.2	93.3	1.3	6.0	92.7	3.2	4.8	91.9	0.0	3.5	96.5	0.0	3.0	97.0

*Severe underweight (<-3 z-score), Moderate underweight (>= -3 and <-2 z-score), Normal (> = -2 z score)

Table (66) shows the prevalence of acute malnutrition based on weight-for- age z-scores according to age groups. As regard severe underweight, the highest prevalence (8.3%) was observed among the age group (54-59 months) in Sudanese participants and (42-53 months) in Eritrean participants. No sever cases were observed among the Somali and Iraqi participants. The highest prevalence of moderate underweight was observed in different age groups among the whole participants being at the age group (18-29 months) among Somali (20.0%) and Ethiopian (11.4%), at the age group (30-41 months) among the Iraqi (16.7%) and Eritrean (14.3%).

Table 67: Prevalence of stunting based on height-for-age z-scores and by sex

	Sudanese		Ethiopian		Eritrean		Somali		Iraqi	
	Boys n **=141**	**Girls** n **= 111**	**Boys** n **= 85**	**Girls** n **= 66**	**Boys** n **= 30**	**Girls** n **= 33**	**Boys** n **= 33**	**Girls** n **= 26**	**Boys** n **= 15**	**Girls** n **= 18**
	% (95% CI)	**% (95% CI)**	**% (95% CI)**	**% (95% CI)**	**% (95% CI)**	**% (95% CI)**	**% (95% CI)**	**% (95% CI)**	**% (95% CI)**	**% (95% CI)**
Prevalence of stunting (<-2 z-score)	9.9 % (6.0-16.0)	7.2 % (3.7-13.6)	8.2 % (4.0-16.0)	9.1 % (4.2- 8.4)	23.3 % (11.8 - 40.9)	15.2 % (6.7 - 30.9)	12.1 % (4.8 - 27.3)	3.8 % (0.7 - 18.9)	6.7 % (1.2 - 29.8)	11.1 % (3.1 - 32.8)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	7.1 % (3.9-12.6)	4.5 % (1.9-10.1)	7.1 % (3.3-14.6)	4.5 % (1.6-12.5)	16.7 % (7.3 - 33.6)	9.1 % (3.1 - 23.6)	9.1 % (3.1 - 23.6)	0.0 % (0.0 - 12.9)	6.7 % (1.2 - 29.8)	0.0 % (0.0 - 17.6)
Prevalence of severe stunting (<-3 z-score)	2.8 % (1.1 - 7.1)	2.7 % (0.9- 7.6)	1.2 % (0.2- 6.4)	4.5 % (1.6- 12.5)	6.7 % (1.8 - 21.3)	6.1 % (1.7 - 19.6)	3.0 % (0.5 - 15.3)	3.8 % (0.7 - 18.9)	0.0 % (0.0 - 20.4)	11.1 % (3.1 - 32.8)

Table 67 shows the prevalence of stunting based on height-for-age z scores by sex. As regard the overall prevalence of stunting, the prevalence ranged from 6.7 % among Iraqi boys to 23.3 % among Eritrean boys and from 3.8 % among Somali girls to 15.2 % among Eritrean girls. The prevalence of moderate stunting was highest among Eritrean boys and girls (16.7 %, 9.1% respectively). On the other hand, 6.7% of Eritrean boys and 11.1% of Iraqi girls were severely stunted.

Table 68: Prevalence of stunting by age based on height-for-age z-scores*

	Sudanese n=252			Ethiopian n=151			Eritrean n=63			Somali n=59			Iraqi n=33		
	Severe stunting n=7	Mod. stunting n=15	Normal n=230	Severe stunting n=4	Mod. stunting n=9	Normal n=138	Severe stunting n=4	Mod. stunting n=8	Normal n=51	Severe stunting n=2	Mod. stunting n=3	Normal n=54	Severe stunting n=2	Mod. stunting n=1	Normal n=30
Age (mo)	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**
6-17	3.2	3.2	93.5	2.9	11.4	85.7	0.0	0.0	100.0	4.8	9.5	85.7	0.0	0.0	100.0
18-29	4.2	14.1	81.7	0.0	2.9	97.1	12.5	12.5	75.0	9.1	9.1	81.8	9.1	9.1	81.8
30-41	1.9	5.8	92.3	3.7	3.7	92.6	14.3	14.3	71.4	0.0	0.0	100.0	16.7	0.0	83.3
42-53	1.8	0.0	98.2	5.4	2.7	91.9	0.0	30.8	69.2	0.0	0.0	100.0	0.0	0.0	100.0
54-59	0.0	0.0	100.0	0.0	11.8	88.2	0.0	0.0	100.0	0.0	0.0	100.0	0.0	0.0	100.0
Total	2.8	6.0	91.3	2.6	6.0	91.4	6.3	12.7	81.0	3.4	5.1	91.5	6.1	3.0	90.9

***** Severe stunting (<-3 z-score), Moderate stunting (>= -3 and <-2 z-score), Normal (> = -2 z score)

The distribution of stunting according to the different age groups was observed in table (68). Prevalence of sever stunting was observed most among Iraqi and Eritrean participants (16.7% and 14.3 % respectively) among the age group (30-41 months). As regard the highest prevalence of moderate stunting, it was observed among Eritrean at the age group (42-53 months) and (30-41 months) representing 30.8% and 14.3% respectively followed by Sudanese participants aged (18-29 months) at 14.1%. On the other hand none of the older age group (54-59 months) was severely stunted, and 11.8% of Ethiopian of the same age group suffered moderate stunting.

Table 69: Prevalence of overweight based on weight for height cut offs and by sex (no oedema)

	Sudanese		Ethiopian		Eritrean		Somali		Iraqi	
	Boys n = 139	**Girls n = 109**	**Boys n = 83**	**Girls n = 65**	**Boys n = 30**	**Girls n = 32**	**Boys n = 31**	**Girls n = 25**	**Boys n = 15**	**Girls n = 18**
	%(95% CI)	%(95% CI)	%(95% CI)	%(95% CI)	%(95% CI)	%(95% CI)	%(95% CI)	%(95% CI)	%(95%CI)	%(95% CI)
Prevalence of overweight (WHZ > 2)	11.5 % (7.2-17.9)	5.5 % (2.5-11.5)	18.1 % (11.3-27.7)	7.7 % (3.3-16.8)	6.7 % (1.8 - 21.3)	3.1 % (0.6 - 15.7)	16.1 % (7.1 - 32.6)	0.0 % (0.0 - 13.3)	13.3 % (3.7 - 37.9)	16.7 % (5.8 - 39.2)
Prevalence of severe overweight (WHZ > 3)	2.2 % (0.7 – 6.2)	0.9 % (0.2-5.0)	7.2 % (3.4-14.9)	4.6 % (1.6-12.7)	0.0 % (0.0 - 11.4)	0.0 % (0.0 - 10.7)	6.5 % (1.8 - 20.7)	0.0 % (0.0 - 13.3)	0.0 % (0.0 - 20.4)	0.0 % (0.0 - 17.6)

As regard the prevalence of overweight based on weight-for-height cut off, it is presented in table 69. The prevalence of overweight ranged from 6.1% among Eritrean boys to 18.1 % among Ethiopian boys and from 0% among Somali girls to 16.7% among Iraqi girls. For sever overweight, the highest prevalence was observed among Ethiopian and Somali boys (7.2% and 6.5% respectively)

Table 70: Prevalence of overweight by age, based on weight for height (no oedema)

	Sudanese n=248		Ethiopian n=148		Eritrean n=62		Somali n=56		Iraqi n=33	
	Overweight (WHZ > 2) n=22	Severe Overweight (WHZ > 3) n=4	Overweight (WHZ > 2) n=20	Severe Overweight (WHZ > 3) n=9	Overweight (WHZ > 2) n=3	Severe Overweight (WHZ > 3) n=0	Overweight (WHZ > 2) n=5	Severe Overweight (WHZ > 3) n=2	Overweight (WHZ > 2) n=5	Severe Overweight (WHZ > 3) n=0
Age (mo)	%	%	%	%	%	%	%	%	%	%
6-17	6.6	0.0	20.6	11.8	0.0	0.0	10.5	10.5	0.0	0.0
18-29	13.0	4.3	14.3	0.0	18.8	0.0	10.0	0.0	36.4	0.0
30-41	15.4	1.9	15.4	11.5	0.0	0.0	8.3	0.0	0.0	0.0
42-53	1.8	0.0	5.4	2.7	0.0	0.0	10.0	0.0	0.0	0.0
54-59	0.0	0.0	12.5	6.3	0.0	0.0	0.0	0.0	25.0	0.0
Total	8.9	1.6	13.5	6.1	4.8	0.0	8.9	3.6	15.2	0.0

Table 70 shows the prevalence of overweight by the studied age groups. The highest prevalence of overweight was observed among Iraqi participants at the age group (18-29 months) and (54-59 months) at (36.4%) and (25.0%) respectively. Ethiopian children aged (6-17 months) had also high prevalence of overweight (20.6%). For the sever overweight, the highest prevalence (11.8%) and (11.5%) was observed among the Ethiopian children at the age group (6-17 months) and (30-41 months) respectively followed by Somali children (6-17 months) with a rate of 10.5% .

Table 71: Mean z-scores and Design Effects

	Sudanese		Ethiopian		Eritrean		Somali		Iraqi	
	Mean z-scores ± SD	Design Effect (z-score < -2)	Mean z-scores ± SD	Design Effect (z-score < -2)	Mean z-scores ± SD	Design Effect (z-score < -2)	Mean z-scores ± SD	Design Effect (z-score < -2)	Mean z-scores ± SD	Design Effect (z-score < -2)
WT-for HT	0.12±1.36	1.00	0.36±1.48	1.00	-0.03±1.35	1.00	0.40±1.51	1.00	0.70±1.02	1.00
WT-for-Age	0.00±1.24	1.00	0.18±1.37	1.00	-0.40±1.26	1.00	0.58±1.19	1.00	0.25±1.23	1.00
HT-for-Age	-0.18±1.45	1.00	-0.13±1.48	1.00	-0.69±1.43	1.00	0.35±1.38	1.00	-0.43±1.52	1.00

NEGATIVE HOUSEHOLD COPING STRATEGIES

Table 72: Coping strategies used by the surveyed population over the past month

Proportion of households reporting using the following coping strategies over the past month*:	Sudanese	Ethiopian	Eritrean	Somali	Iraqi
	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)
Borrowed cash, food or other items with or without interest	69.7 (63.6- 75.2)	69.4 (62.3-75.8)	82.3 (72.3-89.2)	52.3 (40.2-64.1)	59.0 (43.1-73.2)
Sold any assets that would not have normally sold (furniture, seed stocks, tools, other NFI, livestock etc.)	28.1 (22.8-34.1)	7.8 (4.7-12.7)	21.5 (13.8-31.9)	12.3 (6.3-22.8)	46.2 (31.3-61.8)
Requested **increased remittances** or gifts as compared to normal	55.4 (49.0-61.5)	62.0 (54.7-68.8)	62.8 (51.6- 72.8)	66.2 (53.8-76.6)	35.9 (22.5-52.0)
Reduced the quantity and/or frequency of **meals** and snacks	75.5 (69.7-80.6)	87.2 (81.5-91.4)	79.5 (69.1-87.0)	81.0 (69.3-88.9)	60.5 (44.3-74.7)
Begged	6.2 (3.8-10.0)	8.9 (5.5-19.0)	8.9 (4.3-17.5)	18.5 (10.8-29.8)	5.1 (1.3-18.2)
Engaged in potentially **risky or harmful activities**	5.8 (3.4-9.6)	4.4 (2.2-8.7)	3.8 (1.2-11.2)	6.2 (2.3-15.4)	5.1 (1.3-18.5)
Proportion of households reporting using **none** of the coping strategies over the past month	5.4 (3.2-9.1)	2.8 (1.2-6.6)	2.6 (0.6-9.8)	6.3 (2.4-15.8)	10.5 (4.0-25.0)

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

Table (72) shows the coping strategies used by the surveyed population over the past month prior to the survey. Reducing the quantity and/or frequency of meals and snacks was the most common used strategy among the Sudanese, Ethiopian, Somali and Iraqi participants by 75.5%, 87.2%, 81% and 60.5% respectively and the second common among the Eritrean participants by (79.5%) . Among Eritrean, the most common used coping strategy was to borrow cash, food or other items with or without interest (82.3%) which was the second common coping strategy among the Sudanese (69.7%), Ethiopian (69.4%) and Iraqi (59%) participants. Requested increased remittances or gifts as compared to normal was the second common coping strategy among the Somali participants (66.2%). The least used coping strategy was engagement in potentially risky or harmful activities in all the studied nationalities ranged from only 3.8% among Eritrean to 6.2% among Somali participants. Sold any assets that would not have normally sold (furniture, seed stocks, tools, other NFI, livestock etc.) was ranged from 7.8% among Ethiopian to 46.2% among Iraqi. Begged, as a coping strategy, was ranged from 5.1% among Iraqi to 18.5% by Somali participants. The highest percent of not using any coping strategy was among the Iraqi (10.5%) followed by Somali (6.3%) and the least percent of none using was among the Eritrean by 2.6%.

HOUSEHOLD DIETARY DIVERSITY

Table 73: AVERAGE HDDS*

	Sudanese	Ethiopian	Eritrean	Somali	Iraqi
	Mean (95% CI)	Mean (95% CI)	Mean (95% CI)	Mean (95% CI)	Mean (95% CI)
Average HDDS	6.45 (6.21-6.7)	4.83 (4.59-5.1)	5.7 (5.36-6.04)	5.48 (5.0-5.95)	7.54 (7.1-7.98)

* Maximum HDDS is 12.

Table (73), shows the mean and the 95% confidence interval of HDDS among the surveyed nationalities. The biggest mean was among the Iraqi (7.54) followed by the Sudanese (6.45) and the least was among the Ethiopian (4.83), while the moderate mean was for the Somali (5.48) and Eritrean (5.7) participants.

Table 74 : Consumption of micronutrient rich foods by households

	Sudanese	Ethiopian	Eritrean	Somali	Iraqi
	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)
Proportion of households **not consuming** any vegetables, fruits, meat, eggs, fish/seafood, and milk/milk products	14.5 (10.6-19.5)	30 (23.8-37.1)	13.9 (7.9-23.5)	27.7(18.2-39.8)	2.6 (0.4-16.3)
Proportion of households consuming either a plant or animal source of vitamin A	64.0 (57.8-69.9)	36.1(29.4-43.4)	43.0 (32.6-54.1)	53.8 (41.7-65.6)	94.9 (81.5-98.7)
Proportion of households consuming organ meat/flesh meat, or fish/seafood (food sources of haem iron)	26.4 (21.2-32.4)	4.4 (2.2-8.7)	3.8 (1.2-11.2)	13.8 (7.3-24.6)	35.9 (22.5-52.0)

Table (74), Shows the percent consumption of micronutrient rich food by participants households. The pproportion of households ***not consuming*** any vegetables, fruits, meat, eggs, fish/seafood, and milk/milk products was ranged from 2.6% among Iraqi to 30% among the Ethiopians. The highest percent of households consuming either a plant or animal source of vitamin A was among Iraqi by 94.9% and the least was 36.1% among the Ethiopian. The percent among Sudanese, Eritrean and Somali participants was 64%, 43% and 53.8% respectively. Also, the highest percent of households consuming organ meat/flesh meat, or fish/seafood (food sources of haem iron) was among the Iraqi by 35.9% followed by the Sudanese 26.4%, Somali 13.8%, then the Ethiopian 4.4% and the least was among Eritrean by 3.8%.

5. LIMITATIONS

- **Data quality:** The overall quality of the data collected was problematic as indicated by the ENA plausibility score of 63% (see **Appendix 1**). The majority of negative points were due to the overall age distribution; as there were considerably less children in the 54-59 month age group as frequently seen in nutrition surveys. This is perhaps due to mothers more accurately recalling the date of birth of younger children. Also, the study population was likely to be heterogeneous, with some sub-groups more badly affected than others. In situations such as this one, the use of the default +/- 3 SD cleaning window is likely to lead to the exclusion of some true cases of severe acute malnutrition.

- **Accuracy of population data:** UNHCR's ProGres data was used for planning and household selection, therefore sample size was estimated based on the number of households present, and average household size.

- **The use of MUAC cut offs as indicator of malnutrition among school age children and adolescents:** According to the WHO , there are no internationally agreed upon cut-offs for MUAC for children 5-19 years; so results are omitted regarding this indicator

- **Targeted supplementary feeding programme**: Although there is therapeutic and targeted supplementary feeding programmes in most refugee settings to take care of acutely malnourished children, this is not the case in Egypt. Accordingly no results were displayed concerning this important indicator.

- **Food security:** The proportion of households with a ration card among refugees from the selected 5 nationalities was very low covering about 25% of the whole sample with the lowest supply being for Iraqi and Somali nationalities .However food distribution at Refuge Egypt is a targeted distribution for the well-baby and well-child clinics children beneficiaries and not all under five years children and is done as a food ration distribution on monthly basis whereas for TB patients and PLHIV clinic beneficiaries food ration distribution is done every 2 weeks (twice / month) , this may limit clear interpretation of these results.

- **Programme coverage for women:** The coverage of ANC enrolment of and iron-folic acid supplementation to pregnant women should be interpreted with caution due to the small number of beneficiaries that were sampled during the survey.

- **Number of indicators used:** 4 different modules (SENS questionnaires) and the questionnaire for the school age children and adolescents were used in the survey as is becoming increasingly common in UNHCR surveys. As this is quite time consuming it can lead to interviewer fatigue, which may affect the quality of the results. Teams were strictly supervised however throughout data collection.

- **Discussion:** interpretation of results was not done for each nationality separately, as the sample size was calculated based on the proportion of the targeted nationalities (PPS) and no representative sample for each one.

- **Languages:** A number of different languages are spoken by the various nationalities. Efforts were made to ensure that each team was made up of individuals who could speak each of the languages.

6. Discussion

6.1 Nutritional status of young children

The Nutritional status of refugee populations has been an emerging topic of interest in public health over the past several years.

Global acute malnutrition in children aged 6–59 months is the principal indicator of nutritional status in humanitarian emergencies. The prevalence of global acute malnutrition among children between 6-59 months was 6.6% (4.8 - 9.0 95% C.I.) and higher in boys than girls (7.4%; 4.9 - 10.9 95% C.I. & 5.6%; 3.4 - 9.2 95% C.I. respectively). It is worthy to state that the prevalence of oedema was 0.0 % and this prevalence of acute malnutrition was below the WHO emergency threshold of 15% but above the acceptable level 5% (WHO, 2000) .The upper confidence interval of all the previous ranges also follow the same pattern indicating a poor nutrition situation in terms of public health significance.

This prevalence is higher than the one reported among the Syrian refugees at Zaatari camp in Jordan in 2014 which was only 1.2%. The low prevalence of GAM among Syrian refugee children might result, in part, from the on-going infant and child feeding interventions supported by UNICEF and blanket distribution of food vouchers by World Feeding Program (WFP) (Bilukha et al.2014).

On the other hand, the prevalence of moderate acute malnutrition (4.6%) in our sample was higher than the one reported among the Iraqi refugees in Syria, 2009, where the prevalence was 3.5% in the children under five (Lucia, 2010). This may be due to the diversity of nationalities in our sample.

However prevalence of GAM in our sample was much lower than the one observed among refugee children aged 6–59 months from South Sudan arriving in Ethiopia 2014 ranged from 25.8% in Leitchuor to 30.3% in Kule,(Andresen et al. 2014) , reaching approximately twice the WHO emergency threshold of 15% (WHO, 2000).

This survey also documented that the youngest age group (6-17 month) were the most vulnerable to sever malnutrition, and children (18-29 months) were most vulnerable to moderate malnutrition. The higher number of younger children with acute malnutrition is likely due to the weaning process whereby breastfeeding is stopped or reduced and hence the child is more vulnerable to environmental factors influencing their nutritional status. This may also be due to the limited quantity and quality of complementary foods, particularly essential at this age for growth and development and essential for lactating mothers. However, this result is comparable to that at Kakuma refugee camp in Kenya (UNHCR, 2016) and among internally displaced people's camps in Gulu district at northern Uganda were children aged between 3 – 24 months were at an increased risk of suffering from acute malnutrition owing to increased intake of foods low in energy and decreased intake of foods with fat, meat, or milk (Olwedo ,2008)

Sever PEM in form of Kawshiorkor was not present among the studied refugees in this survey while Marasmus which is characterized by severe weight reduction, gross wasting of muscle and subcutaneous tissue, and no detectable edema was present among 2.2% . Marasmus is both inadequate energy and inadequate protein intake, usually seen in times of acute food shortages and famines; this is the most frequent form of protein under-nutrition found in humanitarian emergencies (Baron, 2010). However, this rate of marasmus is considered normal among refugees as in displaced populations, protein

energy malnutrition and chronic under-nutrition prevalence rates may range between 5% to 30% or even up to 80% under long term conditions of stress (Toole, and Waldman, 1997). Rates under 20% are usually considered normal in refugee camps, rates of 20-40% are considered moderate, and prevalence of 40% and above are considered high (Toole ,and Waldman, 1997).

The prevalence of malnutrition was much lower when measured based on MUAC (1.4%) compared to weight-for-height z scores (6.6%). the same was observed for both the severe and moderate acute malnutrition. Furthermore, the prevalence of GAM, MAM and SAM were higher in boys than girls according to MUAC (although the confidence intervals overlap indicating no true difference). The same results were reported in the 2014 WFP and UNHCR Joint Assessment Mission report which was undertaken in both Dadaab and Kakuma refugee camps in Kenya (Njeru , 2014).The only difference was that the prevalence among boys was lower than that among girls. This difference between acute malnutrition as measured by MUAC and weight-for-height z scores has been frequently noted in certain ethnic groups, and has been a significant point of discussion amongst international nutrition groups.

Using MUAC to measure acute malnutrition, it has been found that the severe wasting is highest among the age group 54-59 months and moderate wasting was highest among age group 6-17 months. However, the sample size in these age groups were small, therefore these results need to be interpreted with caution. Nevertheless, this may warrant attention.

From the assessment of MUAC versus WHZ z scores a high percentage of the younger age groups with -2 z-scores were not captured by the MUAC screening criteria. This is also indicated by the low proportion of children identified with MUAC <125 mm in comparison to the proportion identified with -2 WHZ z-scores. Of interest also is the fact that among the smaller age group (6-17 months) there are some children that do not meet the MUAC criteria but meet the respective WHZ score criteria. The same result was also observed in Dollo Ado camps at Ethiopia (UNHCR Dollo Ado Nutrition Surveys, March 2013). In this light, the mixed criteria should be ensured by using MUAC and WHZ scores to capture the children missed by either MUAC or the WHZ scores. WHO also has recommended that MUAC be used in addition to reference values of height or length rather than being used alone (Young, and Jasper, 2006).

Prevalence of underweight based on weight-for-age z-scores represented 6.5% among 554 U5 children assessed in this survey. Girls had higher prevalence of underweight and representing 7.1% compared to 6.0 % among boys. The prevalence of moderate and sever underweight was also higher in girls than boys. This prevalence was higher than the one observed among U5 Sudanese migrants and refugee children in Cairo in 2006; where the total, girls and boys prevalence's were 3.4%, 5.6% and 1.3 % respectively (NNI, 2006) and also higher than the one observed among the Iraqi refugees in Syria 2009, where the prevalence was 5.4% of the children under five years old of which 2.4% were children 6-17 months old (Lucia, 2010). However, this prevalence was nearly similar to the national prevalence of underweight among the under 5 Egyptian children in 2010 which was 6% (7% in boys and 5% in girls) (Egypt DHS, 2014). However, our rate is much lower than the one observed in a 2007 study conducted in Eastern Chad, as the rates of underweight were well above the WHO 15% threshold in children under 5 years of age, with a rate of 20.6% (95% confidence interval [CI]=17.9-23.3) among internally displaced children (Guerrier et al.,2009) and also lower than the figure reported among internally displaced persons in Southern Darfur province in 2004 , where underweight ranged from 10.7% to 23.6% in various parts of the region(Young, and Jasper, 2006)

The prevalence of underweight by age, based on weight-for-age z-scores takes the same distribution of WHZ z scores being higher among the younger age groups. According to Li, 2002, there are several factors that contribute to early childhood being the most vulnerable period for under nutrition. First, nutritional needs are greater in the first two to three years of life, the time when children experience most of their growth and development, secondly, energy and nutrient dense foods are necessary as children are weaned from breast milk, thirdly, children are still developing their immune systems and therefore are more prone to infections; frequent infections, especially among undernourished children, contribute to growth stunting during this period. Moreover, children, especially younger children are dependent on others for care and are vulnerable to poor caring practices. If we look to the previous risk factors, we can find that these factors are most prominent among refugees and maximized by their new situations; away from homes since the resources and wages are limited (Hajoie, 2002).

Stunting refers to a deficit in height relative to age due to a long-term process of linear growth retardation. It has long been proposed as a measure of chronic under nutrition or ill health, but may also be attributed to certain micronutrient deficiencies such as Vitamin A, zinc, calcium or folate (Allen, 1994).

The current survey also showed that ,the prevalence of stunting as well as moderate stunting were higher among boys (10.9% and 8.2% respectively), while severe stunting was more prevalent among girls(4.3%). This prevalence of stunting is higher than the one observed among the Sudanese refugee children in Cairo in 2006 (5.4%) (NNI,2006), however worthy is that it is at acceptable range of <20% and lower than the figure reported among the Iraqi refugees in Syria where 11.9% of the children were stunted (Lucia, 2010)and the prevalence of stunting among the Syrian refugees at Zaatari camp in Jordan at 2014 where 17% of the children were stunted R2 and much lower than the rate at the Kakuma refugee camp at Kenya 2012 (UNHCR Kakuma Operational Updates and RRRP, 2016), where the prevalence of stunting was fairly low at 25.1%, with 7.4% of children suffering from severe stunting; this is considered 'poor' according to WHO classification . This may be due to the impact of protracted refugee situation.

The 30-41 month age group appeared to be most vulnerable to sever stunting, which may be due to the slightly higher prevalence of GAM in the younger age groups, and the fact that catch up growth may not be apparent yet. The same result was also observed in the Kenya nutritional survey (UNHCR Kakuma Operational Updates and RRRP, 2016).

According to Young and Jasper, 2006 , stunting effects are not usually apparent until 2 years of age , so prevention and intervention for chronic under-nutrition must start before the age of 2 years, because it is not completely reversible after that age, thus stunted children generally grow up to be small adults.

The prevalence of overweight was (10.1 %); 10.1% with (WHZ > 2) and 2.7% with (WHZ > 3) and both categories were higher among boys (13.4%) compared to girls (6.0). This prevalence is lower than the one observed among the Sudanese refugee in the study conducted in Cairo in 2006 where the prevalence of overweight represented 11.4% and, it was higher in girls (15.3%) than boys (7.8%) (NNI, 2006). However, overweight among this group does not reflect abundance of valuable possessions or money, instead it may reflects the faulty eating practices and the dependence on the high carbohydrates food items as it is much cheaper than the high protein one. A rise in the prevalence of obesity has been noticed in Western Sahara Refugee Camps, where the most commonly consumed food group were oils/fats (Grijalva-Eternod et al., 2012)

The increased prevalence of over nutrition among boys and under-nutrition among girls may be due to a cultural factor as preferential treatment of male children especially among the Arabic culture has resulted in increased malnutrition among female children 6-59 months old as reported by Madusolumuo and Akogun 1998.

Diarrhoea is often accompanied by malnutrition, which can lead to cycles of wasting, loss of nutrients, immunosuppression, and further Diarrhoeal diseases and other infections. Co-morbidities of communicable infectious diseases such as malaria accompanied by fever, Diarrhoea and pneumonia have been associated with malnutrition among worldwide refugees (Olwedo ,2008).Poor sanitation and contaminated water are the two most important sources of infectious diseases, leading to Diarrhoeal diseases and other infections such as trachoma and intestinal parasites (Severin, 1999)

The survey results showed that 30.3% (95% CI 28.9-39.7) of children 6-59 months surveyed experienced diarrhoea in the two weeks prior to the survey which is considered to be high compared to the national prevalence in Egypt according to Egyptian DHS-2014 where the period prevalence was 14% during the two-week period before the EDHS interview.(Egypt DHS, 2014). Poor sanitary conditions and contaminated water at the refugee's residency places in Egypt may be the two most important causes of Diarrhoea. Although the rate is high however, it is much lower than the rate reported among refugees resident in camps where, Diarrhoea was the main cause of malnutrition among the Iraqi refugees in Syria as it affected 48% of the malnourished children coupled with poor breastfeeding and complementary feeding practices, as well as lack of access to safe water and sanitation (Lucia, 2010). Moreover, in camps in Uganda and Sudan, Olwedo 2008 reported a Diarrhoea prevalence equal to 62% (Olwedo , 2008) Diarrhoea was also the leading causes of death among refugee and internally displaced children in a 2007 study conducted in eastern Chad and stems from poor hygiene and sanitation, and lack of clean drinking water (Harvey & Rogers-Witte, 2007).

6.2 Programme coverage

Measles vaccination and vitamin A supplementation

Measles vaccination coverage for children 12-59 months was very low when confirmed by card (16.3%) or even by card and care giver's recall (74.3%) and Vitamin A capsule supplementation was observed to be very low when confirmed either by card (8.3%) or card and care giver's recall (35.4%). These coverage rates are lower than the target of ≥95% and ≥90% for measles vaccination and vitamin A supplementation respectively. Measles coverage was also lower than the national Egyptian coverage rate in 2014 (Egypt DHS, 2014), which was 95.8% reflecting the need in raising awareness and promoting health seeking behaviours to ensure that refugee children avail themselves from Egypt EPI as their peer nationals at the many accessible MOH Health offices offering routine free vaccination as part of Egypt EPI . As these results were based on both card and recall there is also a need to improve the coverage of cards for reliability and for monitoring. While measles vaccination coverage and vitamin A supplement at Kakuma refugee camp in Kenya exceed the 95% (UNHCR Kakuma Operational Updates and RRRP, 2016), the coverage by card was also low and it is recommended to take more care in using them consistently.

6.3 Anaemia in young children and women

Anaemia affected about 76% of the examined children less than 5 years; being higher

among the age group 6-23 month reaching up to 81.8% .The higher prevalence of moderate to severe anaemia was observed also among the same younger age group. According to WHO classification of public health significance, the level of total anaemia exceeded 40% indicating a high public health significance (WHO, 2011).

This prevalence did not much differ than the reported rates among other refugees elsewhere. Seventy two percent of Burmese children aged 6-59 months living in Nepalese refugee camps in St. Paul, Minnesota had anaemia and 64.9% had iron-deficiency anaemia, the author reported that the cause of the high rates of iron deficiency anaemia in this group was attributed to early and continued bottle feeding of cow's milk past the children's second birthday with little to no complementary feeding as a feeding practice used in this region of the world (Pierce, 3010).

Also, in Kakuma nutrition survey 2012, anaemia levels in children have reduced significantly from 73.6% (95% CI 68.1 – 79.1) in 2010, to 44.4% (95% CI 38.5 – 49.5) in 2011, and 34.4% (95% CI 29.0-39.8) in 2012. The prevalence of anaemia therefore reduced from high to medium public health significance according to WHO classifications. However as expected, the prevalence of anaemia was higher in children 6-23 months at 49.2% (95% CI 41.1-57.4) in 2012, i.e. of high public health significance (>40%). This is believed to be due to either increased vulnerability of younger children or natural physiological differences. A number of anaemia reduction activities have been introduced, strengthened and scaled up in Kakuma as a result of UNHCR's anaemia reduction strategy implemented in 2008, which are likely to have contributed to these positive gains (UNHCR Kakuma Operational Updates and RRRP, 2016).

However, our prevalence is higher than the prevalence of total anaemia in children aged 6-59 months among refugees in other places. In Bokolmanyo, Melkadida, Kobe, Hilaweyn, and Buramino camps in Dollo ado-Ethiopia 2013, the rates were 46.7%, 47.7%, 38.0%, 46.5%, and 58.0% respectively. Also the prevalence of anaemia there was higher at the younger age group (6-23 months) and declined with increasing age. The prevalence of anaemia among the younger age groups (6-23 and 24-35 months) was above 40% in all camps while the prevalence of anaemia among the 36-59 months age group was below 40% but above 20%. In Dollo ado the population depended on food aid which limits the micronutrient intake due to lack of animal protein, fresh fruits and vegetables thus the bioavailability and absorption of micronutrients might not be optimum. Adding to that there were high rates of infection with intestinal worms among the top five morbidities in the camp according to the UNHCR health information system (Dollo Ado Nutrition Surveys, 2013)

Furthermore, a 2007 survey conducted among Bhutanese refugees in refugee camps in Nepal demonstrated that the prevalence of anaemia in children 6-59 months was at 43.3% (95% [CI] 39.0-47.7). When this was further stratified by age the prevalence of anaemia was even higher in children 6-11 months of age, with 78.8% of whom were anaemic, indicating the possibility of anaemic mothers feeding their children breast milk low in iron . The prevalence of anaemia decreased with age to 68.4% for children 12-23 months old. More evidently, as the children got older the prevalence of anaemia decreased to 28.7% in children 24-59 months of age. The suggested reasons for the high prevalence of anaemia in these refugees populations are the inadequate amounts of iron rich foods, poor feeding practices, and frequent episodes of common diseases, such as Diarrhoeal and respiratory infections, which can increase the loss of micronutrients (CDC, 2008). Also, Anaemia prevalence in Zaatari camp among children aged 6–59 months was 48.4%, indicating a problem of major public health significance, according to WHO classification (Bilukha et al.2014). The same result was also observed in all camps of Refugees from South Sudan

arriving in Ethiopia 2014, as the rate exceeded 40 %,(Andresen et al. 2014). However, the higher prevalence of anaemia among U5 children in our survey sample compared to the rates reported from refugee camps may be due to the fact that these camps received aids from international organizations.

The prevalence of total anaemia in non-pregnant women of reproductive age (15-49 years) was 52.2% which is of high public health significance as it is much higher than the acceptable level of below 20% (WHO, 2011). In the camps of Dollo Ado , the rate was lower ranged from 23.7% in Melkadida to 48.0% in Buramino (UNHCR Dollo Ado Nutrition Surveys, 2013) which also ranged from medium to high public health significance and it was 44.8% among Syrian women in Zaatari camp (Bilukha et al.2014). This may be due to substandard antenatal coverage (72% only), closely spaced and frequent pregnancies due to low child spacing services provided to the refugees or may be due to their ignorance of the places providing these services in Egypt but this may require evidence.

The percent of pregnant women currently enrolled in ANC programme is 72% and the percent currently receiving iron-folic acid pills is only 60%. The proportion of surveyed pregnant women who were enrolled in the ANC (with card and recall) at the time of the survey at Dollo Ado camps ranged from 70.2% (in Buramino) to 90% (in Kobe). The coverage of iron/folate supplementation for pregnant women ranged from 51.4% (in Hilaweyn) to 76.5% (in Bokolmanyo) (UNHCR Dollo Ado Nutrition Surveys, 2013). Again this may reflect the lake of awareness about the sites providing the natal care in Egypt among refugees as these services and supplements are provided for free at all the family and health centres in Egypt.

6.4 IYCF indicators

Infant and young children feeding (IYCF) practices directly affect the nutritional status of children under two years of age, and can impact upon child survival. It is therefore essential to protect, promote and support IYCF in order to improve nutrition, health and development of young children (WHO, 2000).

As regard the feeding practice indicators among infants and young children from 0-23 months in this survey, they are considered to be very low. The current survey documented that timely initiation of breast feeding was (34.1%), it was lower than the one reported in Dollo ado camps 2012 where the rate ranged from 78.8% to 87.6% (UNHCR Dollo Ado Nutrition Surveys,2013), and from Kakuma refugee camp in Kenya 2012, where the rate was 86.2% (UNHCR Kakuma Operational Updates and RRRP, 2016).The prevalence of exclusive breast feeding under 6 months (24.6%) is also much lower than the rate reported from Dollo ado camps (77%) (UNHCR Dollo Ado Nutrition Surveys, 2013), and from Kakuma refugee camp in Kenya 2012(76.4%) (UNHCR Kakuma Operational Updates and RRRP, 2016).

WHO recommends that children are breastfed for up to at least 2 years of age as breast milk continues to provide key nutrients beyond the first year of life including protein, fat and a number of nutrients. Although continued breast feeding at 1 and 2 years in our survey was low with 71.7% and 35.1% being breast feed at 1 and 2 years respectively, our rate at the first year was higher than the reported one from Kakuma refugee camp in Kenya,2012 (61.7%) but continuation to the second year was lower (54.3%) (UNHCR Kakuma Operational Updates and RRRP, 2016). Reasons for this may be due to the excess workload to earn money resulting in lack of time for child care, although this would need confirmation. Short birth spacing which is one of the probable reasons for the short duration of continued breast feeding may also be a risk factor specially if there is a poor

child spacing services provided to the lactating mothers.

The proportion of children aged 0-23 months who were bottle fed was 55.9% compared to the range from 11.1% to 22.5% in Dollo Ado camps in Ethiopia (Dollo Ado Nutrition Surveys, 2013) and 6.3% in Kakuma refugee camp in Kenya,2012 (UNHCR Kakuma Operational Updates and RRRP, 2016). Bottle feeding and giving a baby breast milk substitutes such as infant formula or animal milk can threaten the baby's health and survival. Babies who do not receive breast milk do not receive protection from illnesses provided by the mother's antibodies and other components that are gained from her milk. These babies are more likely to experience diarrhoea and respiratory and ear infections. Also, bottle feeding carries with it the risk of contamination and children who are bottle fed are more vulnerable to disease as a result.

The proportion of children 6-23 months who consumed iron rich or iron fortified food 24 hours prior to survey day was 28.3% compared to a range from 77.2% to 97% in Dollo Ado camps in Ethiopia (Dollo Ado Nutrition Surveys, 2013) and 89.6% in Kakuma refugee camp in Kenya (UNHCR Kakuma Operational Updates and RRRP, 2016). This low rate of consumption can explain the high prevalence of anaemia among the surveyed refugees as children need iron-rich foods to protect their physical and mental abilities and to prevent anaemia. Also, timely introduction of solid, semi-solid or soft foods in our sample was low (56.7%) but still higher than the one reported from all Dollo Ado camps (45%) (Dollo Ado Nutrition Surveys, 2013).

However, comparing our IYCF indicators with the one reported in the two previously mentioned studies was unfair as the Dallo Ado camps and Kakuma refugee camp have already in place a UNICEF supported multidimensional and comprehensive policy including educational interventions, increasing awareness and support to lactating mothers and complementary feeding programs.

6.5School age children and adolescents

The current study showed that the prevalence of thinness among school age children and adolescents 5-19 years based on BMI for age Z-score was 10.4% (8.2 – 14.9 95% C.I.), and the prevalence of severe thinness was 5.3% (3.8 - 9.3 95% C.I.). These rates are lower than the rates of malnutrition among 5-9 years old children in a study conducted in Dadaab 2011, where malnutrition based on MUAC cut-off <14 cm was ranging from 15.4% in Hagadera to 23.4% in Ifo and 16.4% in Dagahaley during August and September 2011. (Dadaab Nutrition Surveys, 2011)

In a study conducted in Khartoum (Taha et.al. 2013) on 570 children at 60-180 months age. The prevalence of severe and moderate malnutrition was 4.6% and 15.25% respectively, and the prevalence of stunting reached up to 6.2% and 17.43% for severe and moderate stunting respectively.

Another study on school age children and adolescents 5-16 years in the Seychelles 2011 showed that the prevalence of thinness and severe thinness was 6.4% and 2.0% based on the International Survey cut-offs and 6.7% and 1.2% based on the WHO cut-offs. This low prevalence in Seychelles compared to our current study may be due to the rapidly developing economy of this African country. (Bovet et.al. 2011)

The current study showed that the prevalence of stunting among school age children and adolescents 5-19 years was 5.6% with small sex difference, this rate was found to be lower than the rate recorded by a cross-sectional study that enrolled 835 school children

aged 6–14 years, who live in Dolgo area in the northern region of Sudan where stunting was found to be 7.1%. All measurements were plotted on the World Health Organization (WHO) height for age and BMI charts. (Mohamed and Diab, 2015)

6.6 Food security

The household dietary diversity score (HDDS) is defined as the number of food groups consumed by any member of the household over a reference time period of 24 hours, and therefore does not capture individual dietary intake. It reflects the adequate intake of essential nutrients at the household level and is used as a proxy for dietary intake and household food access.

The mean HDDS was low with households eating an average of 5.6 out of a total of 12 food groups, and the most common foods being consumed being cereals (97.7%), oils/fats (85.3%), vegetables (68.8%) and legumes or nuts (50.2%). This means that households are consuming less than half of the total number of food groups. Nevertheless, this low score reflects limited dietary diversity in the sampled households which needs to be addressed. This may be related to households limited economic power to purchase food items.

Although the current study showed that the Household Dietary Diversity Score (HDDS) among the studied refugees was (5.6%) yet it was comparable to the results documented from Dollo Ado refugee camps (Dollo Ado Nutrition Surveys, 2013) and, better than the one reported In Kakuma Nutrition Survey November 2012, where, the (HDDS) was 4.6. However, when interpreting our result, it must be considered that GFD was not provided for all households and food distribution at Refuge Egypt was targeting the well-baby and well-child clinics children beneficiaries and not all under five years children and is done as a food ration distribution on monthly basis whereas for TB patients and PLHIV clinic beneficiaries food ration distribution is done every 2 weeks (twice / month)

The most common negative coping strategies were to reduce the number of meals per day and/or reduce meal size with 79.2 % (95% CI 77.9 - 84.4) of households reporting using either one of these strategies. The next most common strategy was to borrow cash, food or other items without interest 68.7% (95%CI 66.5 -74.3). Nearly one half of households requested increased remittances or gifts as compared to normal and that 20.7% sold any assets that they would not have normally sold. However, questioning on coping strategies is a sensitive topic, and some households may have been hesitant to share related information, which needs to be considered during interpretation. Nevertheless, results indicate that greater options for non-risky coping strategies need to be investigated.

7. Conclusion

The survey results indicate that immediate measures must be taken to improve the nutrition situation of Sudanese, Eritrean, Ethiopian, Somali and Iraqi refugees in Egypt. These measures should consider the heterogeneity and multi-cultural nature of the refugee residents in order to ensure that the services are well received and utilised. However, sustained efforts will be required to maintain and strengthen existing programmes and activities, and to reduce under-nutrition to acceptable levels (according to WHO classifications this is <5% for wasting, <20% for stunting and 5-20% for anaemia), whilst continuing to protect the health of the general population. This is particularly in light

of the increase in the percent of refugees in Egypt, which is likely to have put a strain on existing resources. Additionally, new arrivals may not have previously been exposed to appropriate health and nutrition education.

After birth, a child's ability to achieve the standards in growth is determined by the adequacy of dietary intake (which depends on infant and young child feeding and care practices and food security), as well as exposure to disease. Under-nutrition and infection are intertwined in a synergistic vicious cycle. Therefore, support to quality child feeding practices (breastfeeding and complementary feeding) and improvement of household food security, together with disease prevention and control programmes, are the most effective interventions that can significantly reduce stunting and acute malnutrition during the first two years of life and onwards into adult life.

There is also need to review the current health and nutrition services for gaps that require strengthening, sustenance of the current services; capacity building for expanded activities. Focus on preventative nutrition activities to build the capacity of caretakers to improve caring practices should also be continued through health education and the full implementation of the IYCF and the anaemia reduction strategies.

Food distribution analysis indicated that continued efforts are required to improve dietary diversity and livelihoods opportunities for refugees, in order to reduce negative coping strategies which can introduce vicious cycles of debt and relief. In the absence of a more diversified diet for older children, it is important that further assessments address issues related to delayed complementary feeding as part of the young child weaning process and whether this is down to the availability of complementary foods, or an education issue.

Apart from Egypt, refugees are mainly dependent on the general food ration with no or little access to additional sources of food/income, thus in Egypt there is a strong need to increase sustainable livelihood options to meet the other basic needs (preferred foods, clothes, shelter repairs, non-food items replacement, transport) .

In summary, the implementation of multi-faceted interventions by all sectors concerned with refugees in Egypt are likely to contribute greatly to this improving situation, however must be maintained to ensure that this improvement continues. These programmes should consider the heterogeneity and multi-cultural nature of the refugees residents in order to ensure that the services are well received and utilised. This means that all agencies need to redouble efforts to ensure that the vulnerable refugees are getting to the services and that these services are able to deliver appropriate care.

8. Recommendations and priorities

Immediate term

1. Given the high prevalence of anaemia among the under five children, school aged children, adolescents, and women of reproductive age, both therapeutic and preventive interventions should be maintained by UNHCR through existing nutritional interventions with NGOs partners as Refuge Egypt well-baby and well- child clinics and mainstreamed into MOH MCH services and other Public responses.

2. WFP to supplement feeding programme for children 6-23 months of age to help ensure that improvements in nutrition situation of infants and young children is sustained, and a reduction of anaemia to acceptable levels is achieved. Ensure increased awareness and sensitisation for proper use of the supplementary foods in

the target group through household visits, education, and mother-to-mother support groups.

3. The UNHCR and Health agencies have to strengthen routine measles vaccination, vitamin A supplementation for children 6-59 months through defaulter tracing and house to house checking of immunisation status by Community Health Workers. Improving the supply and retention of health record cards for children, and enhancing the recording of key information

4. Community Health Workers to improve documentation of Vitamin A supplementation and measles vaccinations in child health books.

Medium term

1. Partners to reinforce activities to improve dietary diversity at household level, and considering the provision of appropriate (non-perishable) complementary foods for example, beans and canned tuna, considering the challenges in buying, transporting and distributing perishable foods at a large scale.

2. WFP and UNHCR to conduct an expanded food security assessment to understand the causes of food insecurity at the household level and, where appropriate, design food security interventions that can support or complement a GFD e.g. food vouchers, cash transfers or vouchers for non-food items.

3. UNHCR is to also support all nutritional awareness activities at partner health NGOs services for mothers and children for the promotion of consumption of iron and vitamin C rich foods and other dietary measures. Intervention could also include awareness raising in schools, through community workers etc., coordination with WFP for up scaling school feeding programmes.

4. Health agencies to conduct qualitative assessments of the health-seeking behaviour of new arrivals, with the aim of improving uptake of services and preventing a deterioration of their nutritional status.

5. After 2 years UNHCR should conduct another cross sectional nutrition survey and within the findings of the households dietary diversity findings the study design should allow separate survey and analysis for each nationality to better inform on many aspects of IYCF feeding practices and also school age and mothers feeding practices to better inform on needed awareness and changing of dietary feeding habits as warranted to promote sound growth and nutritional well-being at household level and to better designs of program interventions.

6. The UNHCR should conduct an in depth study to investigate the risk factors for anaemia among different age groups and women in the reproductive age.

7. The UNHCR should conduct an in depth study to investigate the causes of low vitamin A supplementation and low coverage of measles and other compulsory vaccines.

Long term

1. Improve and scale up the livelihood opportunities for the refugees through developmental-oriented initiatives to improve their economic status.

2. All partners to provide and monitor programmes to aid with end line impact evaluations, for example, consistent supply of the feeding programs.

3. Maintain integrated approach to programming, and ensure sufficient training for new community health workers, and timely re-fresher training where necessary.

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10. Appendices

Appendix 1 - SMART Plausibility Check Report.

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

Overall data quality

Criteria	Flags*	Unit	Excel.	Good	Accept	Problematic	**Score**
Flagged data	Incl	%	0-2.5	>2.5-5.0	>5.0-7.5	>7.5	
(% of out of range subjects)			0	5	10	20	**5** (4.6 %)
Overall Sex ratio	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**4** (p=0.016)
Age ratio(6-29 vs 30-59)	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**4** (p=0.042)
Dig pref score - weight	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**10** (93)
Dig pref score - height	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**10** (89)
Dig pref score - MUAC	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**10** (70)
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	**20** (1.23)
Skewness WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**0** (-0.02)
Kurtosis WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**0** (-0.17)
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	**63** %

The overall score of this survey is 63 %, this is problematic.

There were no duplicate entries detected.

Anthropometric Indices likely to be in error (-3 to 3 for WHZ, -3 to 3 for HAZ, -3 to 3 for WAZ, from observed mean - chosen in Options panel - these values will be flagged and should be excluded from analysis for a nutrition survey in emergencies. For other surveys this might not be the best procedure e.g. when the percentage of overweight children has to be calculated) . Given that we are not in emergency and the study population was likely to be heterogeneous, with some sub-groups more badly affected than others. In situations such as this one, the use of the default +/- 3 SD cleaning window is likely to lead to the exclusion of some true cases of severe acute malnutrition, so SMART flags were not excluded from analysis.

Appendix 2 – Name of Contributors

Survey consultants

1. Prof. Mohamed El- Awady : professor of public health and preventive medicine – department of Community, Environmental, and Occupational Medicine Faculty of Medicine- Ain Shams University
2. Prof. Amany Mokhtar : professor of public health and preventive medicine – Faculty of Medicine - Ain Shams University

UNHCR members

1. Dr. Ashraf Azer- UNHCR Assistant Public health officer
2. Dr. Mona Attia – Lecturer of public health and preventive medicine – department of Community medicine – Faculty of Medicine – Cairo University (former UNHCR Public health Associate)
3. Mr Mohamed Ali – UNHCR Data Management Associate

Survey Team Leaders (staff in the department of Community, Environmental, and Occupational Medicine- Faculty of Medicine Ain - Shams University

1. Prof. Mervat Hasan Radi
2. Dr. Waleed salah
3. Dr. Ayat Farouk
4. Dr. Mostafa El-Shahed
5. Dr. Wafaa Mohamed

Refuge Egypt Medical staff

1. Dr Eman Kamal
2. Dr ERINY zakaria
3. Dr John George

Survey Data collectors (junior physicians at the Faculty of Medicine – Ain Shams University)

1. Ahmed Abd El-Hameed Ahmed
2. Ahmed Salah Labib
3. Ahmed Sayed Tawfeek
4. Ahmed Tantawy
5. Bahaa Eldeen Sayed Tawfeek
6. Hussein Hamdy Gomaa
7. Mohamed Fathi Anwar
8. Mohamed Gomaa Khalil
9. Mohamed Ismail El-Ashwal
10. Mohamed Mahmoud El Nowihy
11. Mohamed Nasser Eldin Abd El-Azeem
12. Mohamed Sayed Kamal
13. Mohamed Yousef Saad
14. Mostafa Shoukry El-Soukkary
15. Mostapha Samir El-Shaarawi
16. Nayera Khairy Eid
17. Samar Mohamed El- Awady
18. Samer Mohamed Mostafa
19. Tamer Mohamed Faried

Survey Data entry (Demonstrators - department of Community, Environmental, and Occupational Medicine - Faculty of Medicine Ain - Shams University)

1. Abeer Abd El Salam Mohamed Ibrahim
2. Manar Mohamed El Laban
3. Nabila Mohamed Raouf
4. Nadia Samy Soliman Selim
5. Vivian Farid Fahmy

Survey haemoglobin measures

1. Dr. Shrif Fatmar
2. Mr. Emad Eldin Abdelrheem

Survey translators: Tadamon field volunteers

1. Aisha Nasser
2. Ashraf Nawai Othman
3. Bekheta Housein
4. Emarat Abdelrazik Amin
5. Fatima Idris
6. Fatma Ibrahim Abdelkader
7. Ibrahim Mohamed Omar
8. Mohamed Ahmed Adam
9. Mohamed Almoustafa Nagm Eldin Albergas
10. Monssour Abdallah Hasan
11. Nada Habib Huriqa
12. Ragaa Hemdan Teia
13. Salah Jawish
14. Zeiad Tarek

Appendix 3

Result Tables for NCHS growth reference 1977

Table 75: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

	All n = 547	**Boys** n = 298	**Girls** n = 249
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(39) 7.1 % (5.3 - 9.6 95% C.I.)	(21) 7.0 % (4.7 - 10.5 95% C.I.)	(18) 7.2 % (4.6 - 11.1 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(31) 5.7 % (4.0 - 7.9 95% C.I.)	(16) 5.4 % (3.3 - 8.5 95% C.I.)	(15) 6.0 % (3.7 - 9.7 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(8) 1.5 % (0.7 - 2.9 95% C.I.)	(5) 1.7 % (0.7 - 3.9 95% C.I.)	(3) 1.2 % (0.4 - 3.5 95% C.I.)

The prevalence of oedema is 0.0 %

Table 76: Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema

		Severe wasting (<-3 z-score)		**Moderate wasting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	134	5	3.7	10	7.5	119	88.8	0	0.0
18-29	141	2	1.4	12	8.5	127	90.1	0	0.0
30-41	110	0	0.0	5	4.5	105	95.5	0	0.0
42-53	119	1	0.8	2	1.7	116	97.5	0	0.0
54-59	43	0	0.0	2	4.7	41	95.3	0	0.0
Total	547	8	1.5	31	5.7	508	92.9	0	0.0

Table 77: 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. 9 (1.6 %)	Not severely malnourished No. 542 (98.4 %)

Table 78: Prevalence of acute malnutrition based on MUAC cut off's (and/or oedema) and by sex

	All n = 556	**Boys** n = 305	**Girls** n = 251
Prevalence of global malnutrition (< 125 mm and/or oedema)	(8) 1.4 % (0.7 - 2.8 95% C.I.)	(6) 2.0 % (0.9 - 4.2 95% C.I.)	(2) 0.8 % (0.2 - 2.9 95% C.I.)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	(5) 0.9 % (0.4 - 2.1 95% C.I.)	(4) 1.3 % (0.5 - 3.3 95% C.I.)	(1) 0.4 % (0.1 - 2.2 95% C.I.)
Prevalence of severe malnutrition (< 115 mm and/or oedema)	(3) 0.5 % (0.2 - 1.6 95% C.I.)	(2) 0.7 % (0.2 - 2.4 95% C.I.)	(1) 0.4 % (0.1 - 2.2 95% C.I.)

Table 79: Prevalence of acute malnutrition by age, based on MUAC cut off's and/or oedema

		Severe wasting (< 115 mm)		**Moderate wasting (>= 115 mm and < 125 mm)**		**Normal (> = 125 mm)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	138	1	0.7	3	2.2	134	97.1	0	0.0
18-29	143	1	0.7	2	1.4	140	97.9	0	0.0
30-41	112	0	0.0	0	0.0	112	100.0	0	0.0
42-53	118	0	0.0	0	0.0	118	100.0	0	0.0
54-59	45	1	2.2	0	0.0	44	97.8	0	0.0
Total	556	3	0.5	5	0.9	548	98.6	0	0.0

Table 80: Prevalence of acute malnutrition based on the percentage of the median and/or oedema

	n = 547
Prevalence of global acute malnutrition (<80% and/or oedema)	(27) 4.9 % (3.4 - 7.1 95% C.I.)
Prevalence of moderate acute malnutrition (<80% and >= 70%, no oedema)	(27) 4.9 % (3.4 - 7.1 95% C.I.)
Prevalence of severe acute malnutrition (<70% and/or oedema)	(0) 0.0 % (0.0 - 0.7 95% C.I.)

Table 81: Prevalence of malnutrition by age, based on weight-for-height percentage of the median and oedema

		Severe wasting (<70% median)		Moderate wasting (>=70% and <80% median)		Normal (> =80% median)		Oedema	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	134	0	0.0	13	9.7	121	90.3	0	0.0
18-29	141	0	0.0	8	5.7	133	94.3	0	0.0
30-41	110	0	0.0	3	2.7	107	97.3	0	0.0
42-53	119	0	0.0	2	1.7	117	98.3	0	0.0
54-59	43	0	0.0	1	2.3	42	97.7	0	0.0
Total	547	0	0.0	27	4.9	520	95.1	0	0.0

Table 82: Prevalence of underweight based on weight-for-age z-scores by sex

	All n = 554	**Boys** n **=** 302	**Girls** n **=** 252
Prevalence of underweight (<-2 z-score)	(42) 7.6 % (5.7 - 10.1 95% C.I.)	(21) 7.0 % (4.6 - 10.4 95% C.I.)	(21) 8.3 % (5.5 - 12.4 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(34) 6.1 % (4.4 - 8.5 95% C.I.)	(18) 6.0 % (3.8 - 9.2 95% C.I.)	(16) 6.3 % (3.9 - 10.1 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(8) 1.4 % (0.7 - 2.8 95% C.I.)	(3) 1.0 % (0.3 - 2.9 95% C.I.)	(5) 2.0 % (0.9 - 4.6 95% C.I.)

Table 83: Prevalence of underweight by age, based on weight-for-age z-scores

		Severe underweight (<-3 z-score)		Moderate underweight (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	136	2	1.5	5	3.7	129	94.9	0	0.0
18-29	141	2	1.4	16	11.3	123	87.2	0	0.0
30-41	113	0	0.0	8	7.1	105	92.9	0	0.0
42-53	120	3	2.5	4	3.3	113	94.2	0	0.0
54-59	44	1	2.3	1	2.3	42	95.5	0	0.0
Total	554	8	1.4	34	6.1	512	92.4	0	0.0

Table 84: Prevalence of stunting based on height-for-age z-scores and by sex

	All n = 558	**Boys** n = 304	**Girls** n = 254
Prevalence of stunting (<-2 z-score)	(45) 8.1 % (6.1 - 10.6 95% C.I.)	(25) 8.2 % (5.6 - 11.9 95% C.I.)	(20) 7.9 % (5.2 - 11.8 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(33) 5.9 % (4.2 - 8.2 95% C.I.)	(23) 7.6 % (5.1 - 11.1 95% C.I.)	(10) 3.9 % (2.2 - 7.1 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(12) 2.2 % (1.2 - 3.7 95% C.I.)	(2) 0.7 % (0.2 - 2.4 95% C.I.)	(10) 3.9 % (2.2 - 7.1 95% C.I.)

Table 85: Prevalence of stunting by age based on height-for-age z-scores

		Severe stunting (<-3 z-score)		**Moderate stunting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	138	3	2.2	9	6.5	126	91.3
18-29	144	3	2.1	12	8.3	129	89.6
30-41	111	3	2.7	5	4.5	103	92.8
42-53	121	3	2.5	5	4.1	113	93.4
54-59	44	0	0.0	2	4.5	42	95.5
Total	558	12	2.2	33	5.9	513	91.9

Table 86: Prevalence of overweight based on weight for height cut off's and by sex (no oedema)

	All n = 547	**Boys** n = 298	**Girls** n = 249
Prevalence of overweight (WHZ > 2)	(42) 7.7 % (5.7 - 10.2 95% C.I.)	(26) 8.7 % (6.0 - 12.5 95% C.I.)	(16) 6.4 % (4.0 - 10.2 95% C.I.)
Prevalence of severe overweight (WHZ > 3)	(10) 1.8 % (1.0 - 3.3 95% C.I.)	(5) 1.7 % (0.7 - 3.9 95% C.I.)	(5) 2.0 % (0.9 - 4.6 95% C.I.)

Table 87: Prevalence of overweight by age, based on weight for height (no oedema)

		Overweight (WHZ > 2)		Severe Overweight (WHZ > 3)	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**
6-17	134	11	8.2	4	3.0
18-29	141	16	11.3	2	1.4
30-41	110	7	6.4	1	0.9
42-53	119	4	3.4	2	1.7
54-59	43	4	9.3	1	2.3
Total	547	42	7.7	10	1.8

Table 88: 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	547	-0.01±1.34	1.00	54	0
Weight-for-Age	554	-0.10±1.39	1.00	47	0
Height-for-Age	558	-0.04±1.41	1.00	43	0

Appendix 4 – Survey Questionnaires

Standardised Expanded Nutrition Survey (SENS) Questionnaire

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 refugees in Cairo.

- 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 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.

CHILDREN 6-59 MONTHS ANTHROPOMETRY, AND HEALTH: 1 questionnaire per HH *(*THIS QUESTIONNAIRE IS TO BE ADMINISTERED TO ALL CHILDREN BETWEEN 6 AND 59 MONTHS OF AGE**)** **Case number**: _____

Date of interview (dd/mm/yyyy): |___|___|/|___|___|/|___|___||___|___|		**Nationality :** **Residence :**	

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. Therapeutic feeding programme (TFP)---- Supplementary feeding programme (SFP)

School age CHILDREN 5-19 Years ANTHROPOMETRY, AND HEALTH: 1 questionnaire per HH *(*THIS QUESTIONNAIRE IS TO BE ADMINISTERED TO ALL CHILDREN BETWEEN 5 AND 19 YEARS OF AGE**)** **Case number**: _____

Date of interview (dd/mm/yyyy): |___|___|/|___|___|/|___|___||___|___|		**Nationality :** **Residence :**	

SCH1	**SCH2**	**SCH3**	**SCH4**	**SCH5**	**SCH6**	**SCH7**	**SCH8**	**SCH9**	**SCH10**	**SCH11**	**SCH12**	**SCH13**	**SCH14**
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	**MUAC** (mm)	**Child enrolled in school** 1=Yes 2=No (go to SCH 13)	1=Primary 2=Preparatory 3=Secondary	Do you take breakfast Daily 1=Yes 2=No	**Fast food*** consumption** **1-Daily** **2- weekly** **3-Monthly** **4- Never**	**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.

*** **Fast food : mention examples**

WOMEN Anthropometry & ANAEMIA: 1 questionnaire per HH (THIS QUESTIONNAIRE IS TO BE ADMINISTERED TO ALL WOMEN AGED BETWEEN 15 AND 49 YEARS IN THE SELECTED HOUSEHOLD) **Case number**: _____

Date of interview (dd/mm/yyyy): |___|___|/|___|___|/|___|___||___|___|				**Nationality :** **Residence :**					
WM1	**WM2**	**WM3**	**WM4**	**WM5**	**WM6**	**WM7**	**WM8**	**WM9**	**WM10**
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)	**Weight** (kg)	**Height** (cm)
01									
02									
03									
04									
05									
06									
07									
08									
09									
10									
11									

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)

Case number: _____ **Consent** : yes / no / absent

Date of interview (dd/mm/yyyy)		
|___|___|/|___|___|/|___|___||___|___|	**Nationality :** **Residence :**	
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] Fortified blended foods	11B……..1	2	8
11C. [INSERT FBF++ AVAILABLE IN THE LOCAL SETTING AND USE LOCAL NAMES]	11C……..1	2	8
11D. [INSERT RUTF PRODUCTS AVAILABLE IN THE LOCAL SETTING AND USE LOCAL NAMES] Ready-to-use therapeutic foods (SHOW SACHET)	11D……..1	2	8
11E. [INSERT RUSF PRODUCTS AVAILABLE IN THE LOCAL SETTING AND USE LOCAL NAMES] (SHOW SACHET) Ready-to-use supplementary foods	11E……..1	2	8
11F. [INSERT LNS PRODUCTS AVAILABLE IN THE LOCAL SETTING AND USE LOCAL NAMES] Lipid-based nutrient supplement (SHOW SACHET / POT)	11F……..1	2	8

	11G. [INSERT LOCALLY AVAILABLE BRAND NAMES OF *IRON FORTIFIED* INFANT FORMULA *ONLY*]	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]	11H……..1 2 8	
IF12	**In a setting where micronutrient powders (**MNP**) 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	|___|

FOOD SECURITY: 1 questionnaire per household *(*THIS QUESTIONNAIRE IS TO BE ADMINISTERED TO THE MAIN CARETAKER WHO IS RESPONSIBLE FOR COOKING THE MEALS)

Case number: _____**Consent** : yes / no / absent

Date of interview (dd/mm/yyyy)	
|___|___|/|___|___|/|___|___||___|___|	**Nationality :** **residence :**

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……|___|
*A ration card is a stamp or card issued by a government to allow the holder to obtain food or other commodities that are in short supply during wartime or in other emergency situations when rationing is in force.		