Report of a Multi Indicator Cluster Survey

12th – 21st February 2015

Abyei Administrative Area

GOAL South Sudan Programme

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List of Abbreviations

AAA	Abyei Administrative Area
ACAD	Abyei Community Actions for Development
ANC	Ante Natal Care
ARI	Acute Respiratory Infection
ART	Antiretroviral therapy
BCG	Bacillus Calmette–Guérin
CHF	Common Humanitarian Fund
CI	Confidence Interval
CLTS	Community-led total sanitation
cm	centimetre
CMR	Crude Mortality Rate
CPA	Comprehensive Peace Agreement
DBC	Designing behaviour change
DPT	Diphtheria, Pertussis, Tetanus
ECHO	European Commission's Humanitarian Aid and Civil Protection department
ENA	Emergency Nutrition Assessment
EPI	Extended Programme of Immunisation
FP	Family planning
GAM	Global Acute Malnutrition
GFD	General Food distribution
GoS	Government of Sudan
HAZ	Height-for-age z-scores
HFA	Height for Age
HIV	Human Immunodeficiency Virus
HH	Household
IAPF	Irish Aid Programme Fund
ID	Index of Distribution
IDP	Internally Displaced Person
IPSE	Innovative, progressive, successful entrepreneurs
IPT	Intermittent preventive treatment
IRS	Indoor residual spraying
IT	Information technology
ITN	Insecticide treated net
IUD	Intra-uterine device
IYCF	Infant and young child feeding
kg	kilogram
LLITN	Long Lasting Insecticide Treated Net
MICS	Multi-Indicators Clusters Survey
mm	millimetre
MoH	Ministry of Health
MSF	Medicines Sans Frontiers
MTCT	Mother to child transmission
MUAC	Mid Upper Arm Circumference
N	Total number

n	Number in sub group
NCHS	National Center For Health Statistics
NFI	Non Food Items
NGOs	Non-Government Organizations
NIPP	Nutrition impact positive practice
OFDA	Office of US Foreign Disaster Assistance
OPV	Oral polio vaccine
ORS	Oral Rehydration Salts
OTP	Outpatient therapeutic Programme
Penta	Pentavalent
PHC	Primary health care
PHCC	Primary health care centre
PHCU	Primary health care unit
PNC	Post Natal Care
PPS	Probability proportion to size
REFLECT	Regenerated Freirean Literacy through Empowering Community Techniques
SAF	Sudanese armed forces
SAM	Severe Acute Malnutrition
SD	Standard Deviation
SFP	Supplementary feeding programme
SMART	Standardized Monitoring and Assessment of Relief and Transitions
SPLM/A	Sudanese Peoples' Liberation Movement/Army
SS	South Sudan
RRC	Relief and Rehabilitation Commission
STI	Sexually transmitted infection
TBA	Traditional Birth Attendant
TT	Tetanus toxoid
U5MR	Under Five Mortality Rate
UN	United Nations
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
UNISFA	United Nations Interim Security Force for Abyei
VCT	Voluntary counselling and testing
VSLA	Village savings and loan association
WASH	Water and Sanitation/ Hygiene programme
WAZ	Weight-for-age z-scores
WFP	World Food Programme
WFH	Weight For Height
WHO	World Health Organization
WHZ	Weight-for-height z-scores

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Executive Summary

Methodology
A 43*10 cluster sample approach was adopted for the survey using SMART[1] methodology, covering accessible areas south of the river Kiir of AAA and Abyei town. The survey took place from the 12th – 21st February 2015, using Ministry of Health (MoH) and GOAL survey guidelines.

Across the 43 clusters: 409 children aged between six and 59 months were randomly selected for the collection of anthropometric data; health data was analyzed for 199 children between 0-59 months; infant feeding data was analyzed for 166 infants between 0-23 months. Household data was analyzed for 213 households including information covering general health, food security, livelihoods and HIV. Mortality data was analyzed for 2,729 people to estimate the retrospective mortality rates. The plausibility report generated by SMART scored the overall survey at 3% which means that the quality of the data is good.

Overall objective
To identify the current situation in the GOAL operational areas in terms of retrospective mortality, health, water, sanitation and hygiene (WASH), HIV, nutrition and food security and livelihoods.

Key findings

Anthropometric indices (WHO standards 2006) - Acute malnutrition
Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex (WHO, 2006)

	All n = 403	**Boys** n = 204	**Girls** n = 199
Prevalence of global acute malnutrition (<-2 z-score and/or oedema)	(79) 19.6 % (15.7 - 24.2 95% C.I.)	(44) 21.6 % (16.7 - 27.4 95% C.I.)	(35) 17.6 % (12.7 - 23.9 95% C.I.)
Prevalence of moderate acute malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(67) 16.6 % (12.9 - 21.2 95% C.I.)	(40) 19.6 % (14.7 - 25.6 95% C.I.)	(27) 13.6 % (9.2 - 19.5 95% C.I.)
Prevalence of severe acute malnutrition (<-3 z-score and/or oedema)	(12) 3.0 % (1.7 - 5.2 95% C.I.)	(4) 2.0 % (0.7 - 5.1 95% C.I.)	(8) 4.0 % (1.9 - 8.2 95% C.I.)

The prevalence of oedema is 0.0%

Mortality

	CMR: Total deaths/10,000 people/day	**U5MR: Deaths 0-5 years/10,000 children 0-5 years/day**
Abyei MICS Feb 2015 (95% CI)	0.60 (0.35-1.04)	1.22 (0.51-2.85)
Abyei MICS Jan 2012 (95% CI)	0.41 (0.20-0.82)	1.02 (0.47-2.20)
Abyei MICS Dec 2010 (95% CI)	0.41 (0.18-0.92)	0.99 (0.34-2.82)
Sphere Emergency Threshold	0.8	2.1
Average baseline for Sub Saharan Africa	0.41	1.07

Morbidity
Prevalence of reported illness in children in the two weeks prior to survey 0-59 months (N=199):

Prevalence of reported illness	**49.3%** (n=98) (95% CI 42.38-56.14)

[1] Standardized Monitoring and Assessment of Relief and Transitions, October 2007, M. Golden et al

GOAL South Sudan Indicators

INDICATOR		*Nov 2006*	*Nov 2007*	*May 2009*	*Jan 2010*	*Dec 2010*	*Jan 2012*	*Feb 2014 (results not validated due to poor data quality)*	*Feb 2015*
Area surveyed			Abyei town and accessible areas south of river Kiir	Accessible areas north and south of river Kiir	Accessible areas north and south of river Kiir	Accessible areas south of river Kiir	Accessible areas south of the river Kiir	Rumameer, Mijak, and Abyei Town payams	Accessible areas south of the river Kiir and Abyei town
General Population Demographics									
Average HH size		5.9	7.1	7.3	7.5	7.5	8.5	8.0	9.0
% of sample <5 years		-	-	-	-	-	-	19.4%	22.6
Average number <5 years per HH		1.3	1.6	1.5	1.5	1.6	1.5	1.6	1.9
% IDPs		7.8	4.6	1	13.6	4.2	21.5 (in last 12 months)	21.8	15.0
% Returnees (in last 12 months)		34.7	14.1	95	7.1	1.8	7.7	17.1	0.5
% Residents		54.1	81	4	*79.4	93.4	66.3	60.1	84.5
% female headed HHs		36.4	14.6	23	16	22.7	19.9	43.7	26.8
Nutrition									
% 6-59 months MUAC <115mm		-	-	1.2	0.8	1.2	2.4	4.1	1.0
% 6-59 months MUAC 115-124mm		-	-	4.9	6.2	4.8	6.6	0.9	8.1
% Global acute malnutrition	(WHO ref)	-	22.2	24.4	17.6	16.5	20.6	20.9	19.6
	(NCHS ref)	20.0	21.0	24.1	19.1	16.4	20.9	23.0	20.2
% Severe acute malnutrition	(WHO ref)		4.7	4.9	4.4	2.4	2.5	7.1	3.0
	(NCHS ref)		1.6	1.2	2.4	1.4	1.7	6.6	0.5
% Global underweight	(WHO ref)	-	23.9	27.1	19.2	21.8	27.7	18.9	25.2
	(NCHS ref)	-	31.2	36.5	28.3	29.9	38.4	26.4	35.1

INDICATOR		Nov 2006	Nov 2007	May 2009	Jan 2010	Dec 2010	Jan 2012	Feb 2014 (results not validated due to poor data quality)	Feb 2015
% Global severe underweight	(WHO ref)	-	6.4	7.5	4.2	5.8	7.1	4.9	4.0
	(NCHS ref)	-	6.1	6.6	3.4	4.9	7.3	5.1	5.4
% Global chronic malnutrition	(WHO ref)	-	21.9	19.9	19.5	20.7	24.1	18.6	18.6
	(NCHS ref)	11.6	17.6	15.5	15.3	15.3	20.0	14.9	12.8
Mortality									
Crude mortality rate (/10,000/day)		0.36	040	0.57	0.38	0.41	0.41	-	0.60
Under 5 death rate (/10,000/day)		0.55	0.56	1.06	0.76	0.99	1.02	-	1.22
Leading cause of death in family members >5 years		ARI & Diarrhoea	-	Malaria	Malaria	Unknown	Unknown	-	None
Leading cause of death in family members <5 years		Neonatal death	-	Neonatal death	Neonatal death	No main cause	Unknown	-	Diarrhoea
Vaccination Status[2]									
% 6-59 months Vitamin A in the past 6 months, recall or card		88.7	60.2	83.4	71.2	57.2	73.5	47.9	50.8
% 9-59 months Measles with card		17	19	12.3	23.7	38.3	40.7	73.2[3]	24.0
% 9-59 months Measles, recall and card		56.1	59.3	56.2	65	66.2	85.8	78.0[4]	56.7
% 12-23 months measles, recall and card		-	-	-	-	-	85.9	78.0	66.7
% 6-59 months with BCG scar		59	57.9	54.1	56.4	57.2	-	-	-
% 6-59 months 3 doses DPT3/Pentavelent3 with card[5]		18.4	20.8	15.5	30.3	38.4	40.8	-	28.3
% 6-59 months 3 doses DPT3/Pentavelent3, recall and card		64.4	67.4	66.7	71.7	70.5	85.1	-	68.1

[2] For the December 2010 MICS vaccination results (excluding measles) are analysed for children 12-59 months following advice from the EPI in South Sudan.
[3] Analysed on children 12-23 months only
[4] Analysed on children 12-23 months only
[5] At the time of the December 2010 MICS the DPT vaccination had been replaced by Pentavelent which includes the DPT antigen. In early 2011 this was switched back to DPT.

INDICATOR	*Nov 2006*	*Nov 2007*	*May 2009*	*Jan 2010*	*Dec 2010*	*Jan 2012*	*Feb 2014 (results not validated due to poor data quality)*	*Feb 2015*
% 12-23 months DPT3/Pentavelent3, recall and card	-	-	-	-	-	84.4	85.8	74.3
% 6-59 months 3 doses OPV with card	-	19.5	17.7	29.3	38.0	-	-[6]	-
% 6-59 months 3 doses OPV, recall and card	-	71.6	66.2	70.6	71.3	-	-	-
Childhood Illness								
% 0-59 months who have been ill in the 2 weeks prior to survey	45.2	36.0	48.2	44.7	45.2	36.9	48.1	49.3
Main cause of illness in children <5 years	28.8 (Malaria/Fever)	35.5 (ARI/Cough)	21.3 (diarrhoea)	39.5 (Fever/ malaria)	38.1 (Fever/ malaria	38.0 (diarrhoea)	26.8 (Fever)	21.1 (Malaria/ fever)
% of children <5 whose mothers report that they had a diarrhoeal episode in the past two weeks	-	-	-	-	-	13.7	9.9	8.0
% of ill children with fever 2 weeks before the survey who were brought to a health facility by their carer	-	-	60.6	72.2	79.5	78.7%	-	90.5
% of children (0-59 months) with fever in the last two weeks who were referred to a health facility within 24 hours	-	-	-	-	-	43.5	-	84.2
% of mothers of children <5 years who would refer their child to a health facility with a cough and difficult breathing	-	-	-	82.1	85.0	-	-	92.9

[6] 60.8% of children 6-59 months old surveyed had received a polio vaccine based on their EPI card (and 87.9% based on card and recall). However, no data was collected on the number of doses.

INDICATOR	*Nov 2006*	*Nov 2007*	*May 2009*	*Jan 2010*	*Dec 2010*	*Jan 2012*	*Feb 2014 (results not validated due to poor data quality)*	*Feb 2015*
% of mothers of children (aged 6-59 month) who report that the offered increased fluids and continued/increased feeding during the most recent episode of diarrhoea in their child	-	-	-	-	-	19.9	0.5[7]	-
Infant and young child feeding								
% of children <24 months ever breastfed	-	-	99.6	100	99.6	100.0	88.4	100
% of children <24 months put to the breast within the first hour of life	77.8	74.5	92.8	87.3	77.1	94.7	65.9	77.6
% of infants <6 months exclusively breastfed, 24 hours before survey	-	7	12.5	24.6	36.9	52.5	77.6[8]	0.0
% of children 12-15 months receiving breast milk, 24 hours prior to survey	-	-	94.9	81.6	59.6	78.7	-	76.9
% of children 20-23 months receiving breast milk, 24 hours prior to survey	-	-	90.3	98.2	25.0	43.2	-	31.6
% of children 12-23 months still being breastfed	-	-	-	-	-	64.4	79.5	58.7
% of infants 6-8 months receiving complementary foods, 24 hours prior to survey	-	25.2	69.2	63.2	55.8	86.8	-	91.7
% of children 6-23.9 months receiving food from 4 or more food groups, 24 hours prior to survey	-	-	00	00	2.2	0.5	0.0[9]	2.7

[7] Due to survey design, data was only analysed for children 6-23 months old. Questions on feeding during diarrhoeal episodes did not explicitly refer to the most recent episode. Data was taken was collected for children, and not mothers, and therefore the result is not a direct indicator of rates of knowledge and practice (as mothers with more children would receive more weight than mothers with fewer).

[8] Due to survey design, this may also include children who were not fed at all the 24 hours prior to the survey.

[9] Due to survey design, no distinction was made between “fruits and vegetables” and “vitamin A-rich fruits and vegetables”.

INDICATOR	*Nov 2006*	*Nov 2007*	*May 2009*	*Jan 2010*	*Dec 2010*	*Jan 2012*	*Feb 2014 (results not validated due to poor data quality)*	*Feb 2015*
% of children 6-23 months who received adequate meal frequency in the last 24 hours	-	-	-	-	-	22.1	53.3	60.6
% of children 6-23 months who received the minimum acceptable diet during the last 24 hrs (including diet diversity and frequency)	-	-	-	-	-	0.5	0.0	1.8
% of mothers who provide increased fluids and continued feeding during diarrhoeal disease	-	-	39.4	38.6	42.6	-	0.5[10]	-
% of mothers who provide ORS/salt sugar solution to a child with diarrhoea	-	-	18.5	24.3	34.1	-	-	-
General health status								
% HHs who perceive an improvement in their health status since the same time last year	-	-	-	40.4	40.1	27.9	16.9	27.3
Main factor contributing to an improvement (% HHs)	-	-	-	More access to food 31.4%	Health services have improved 48.1%	-	Better Quality Health Services 93.5%[11]	Health services have improved 58.6%
% HHs who perceive a deterioration in their health status since the same time last year		-	-	9.2	13.2	58.3	9.9	39.4

[10] Due to survey design, data was only analysed for children 6-23 months old. Questions on feeding during diarrhoeal episodes did not explicitly refer to the most recent episode. Data was taken was collected for children, and not mothers, and therefore the result is not a direct indicator of rates of knowledge and practice (as mothers with more children would receive more weight than mothers with fewer).

[11] Percentage of households who reported that household health had "gotten a lot better".

INDICATOR	*Nov 2006*	*Nov 2007*	*May 2009*	*Jan 2010*	*Dec 2010*	*Jan 2012*	*Feb 2014 (results not validated due to poor data quality)*	*Feb 2015*
Main factor contributing to a deterioration (% HHs)		-	-	Health services worse & less access to food, each 35.5%	Less access to food 34.1%	-	Less able to afford food 46.3%[12]	Less access to food 22.6%
Malaria								
% HHs reporting ownership of at least one mosquito net	-	83.8	80.9	75.2	92.2 (LLITNs)	87.5	-	78.4
Average number of nets owned per HH	5	3	1.2	3.1	3.1	2.8	-	2
% of children <5 years who slept under net on the night before survey	-	-	1.6	54.3	68.6	70.2	72.1	66.3
% of pregnant women who slept under net on night before survey	-	-	7.5	55.6	72.0	83.3	-	-
% of survey population who slept under net on the night before survey	5.5	83.9	12.5	31.6	44.5	37.2	-	-
% HHs who can correctly identify how malaria is transmitted	68	-	-	56	61.1	65.0	-	59.2
Reproductive Health[13] **(based on the pregnancy and birth of the youngest child)**								
% of mothers who attended 2 ANC visits or more during their last pregnancy	40.5	29	56	31.1	34.0	74.5	61.8	86.3
% of mothers who attended 4 ANC visits or more during their last pregnancy	-	-	-	-	-	47.0	23.6	59.7
%TT1 coverage, recall	-	-	30	14.4	5.6	17.7	-	10.9
%TT1 coverage, recall and card	-	-	-	23.4	24.5	25.2	-	19.9

[12] Percentage of households who reported that household health had "gotten a little worse".
[13] Prior to 2012, this was collected only from women who gave birth in the past year

INDICATOR	*Nov 2006*	*Nov 2007*	*May 2009*	*Jan 2010*	*Dec 2010*	*Jan 2012*	*Feb 2014 (results not validated due to poor data quality)*	*Feb 2015*
%TT2 coverage, recall	53.2	34.8	19.1	35.1	23.3	27.0	-	19.9
%TT2 coverage, recall and card	87.4	51.6	11.8	55.8	54.4	53.5	-	30.8
% of mothers of children <5 who had received at least 2 TT injections by the time their youngest child was delivered (ANC card and recall)	-	-	-	-	-	49.6	79.6	61.6
% of women who gave birth in the past year who received at least two doses of IPT, recall	44.3	-	-	-	-	27.0	-	15.6
% of women who gave birth in the past year who received at least two doses of IPT, recall and card	82.3	-	-	-	-	53.6	-	27.5
% of women attended a health facility for delivery	25.3	-	10.9	27.3	41.5	45.1	56.8	49.8
% of women who had a skilled attendant at delivery	-	-	34.5	46.8	53.2	45.9	-	33.2
% mothers who received post natal check-up	-	21.9	1.8	37.8	49.9	79.7	-	69.4
% of new-borns who received a post natal check-up	-	2.6	2.7	36.9	48.8	79.0	-	71.3
HIV								
% of people who have heard of HIV in the community	64.6	-	80	69	80.8	-	-	59.6
% HHs who can indicate 2 or more methods of HIV prevention	-	-	-	29.2	39.9	38.6	-	34.8
% HHs who would support / accept community member living with HIV[14]	-	-	13.2	23	33.5	22.7	-	31.9

[14] Proxy indicator to capture stigma in the community.

INDICATOR	*Nov 2006*	*Nov 2007*	*May 2009*	*Jan 2010*	*Dec 2010*	*Jan 2012*	*Feb 2014 (results not validated due to poor data quality)*	*Feb 2015*
Livelihoods								
Main source of HH expenditure	-	-	79.5 (Food)	99.4 (Food)	96.9 (Food)	-	-	-
% HHs indicating 2 or more sources of cash income	-	-	0	2.7	23.7	29.2	20.0	55.4
% HHs indicating 2 or more sources of HH food	-	-	0	19.8	10.2	51.9	-	70.0
% of HHs having two or more income sources and report income has increased in the last 12 months	-	-	-	-	-	-	7.6	8.0
Main source of food for households in the community	60.9 Own production	70 Own production	95.3 Market purchase	67.6 Food aid	62.9 Own production	63.3 (Purchased: market/ shop)	-	56.8 (Food aid)
% HHs who have received a general food ration in the past 3 months	13.2	2.8	3.1	-	34.5	-	-	-
% of HHs who can indicate that there are at least four food groups in stock in the home (on day of the interview)	-	-	-	-	-	0.0	-	1.4
WASH								
% HHs indicating at least 3 appropriate times for hand washing (after defecation, after handling child faeces, before cooking, before eating, (from 2015) before breast feeding)	-	-	-	21.5	32.6	15.8	-	33.3
% HHs with soap at the place for hand washing	-	-	58.5	79.1	67.8	67.1	82.2[15]	65.3

[15] A combination of observation and reporting.

INDICATOR	*Nov 2006*	*Nov 2007*	*May 2009*	*Jan 2010*	*Dec 2010*	*Jan 2012*	*Feb 2014 (results not validated due to poor data quality)*	*Feb 2015*
% HHs using protected water source, dry season	86.6	77	61.6	95.3	95.2	87.9	86.9	90.6
% HHs using protected water source, wet season	79.9	78.1	10	91.7	92.8	88.6	86.7	85.9
% of HHs using protected water source (dry season) or using an appropriate treatment method	-	-	-	-	-	88.6	-	92.0
% HHs taking <30 minutes to walk to the nearest improved water source	21.1	87.2	44.3	26.8	89.0	84.9[16]	38.5	75.6
Average daily consumption of water (litres/person/day)	11.4	12.1	7.4	10.3	11.0	12.3	14.56	9.6
% HHs using less than 10 litres per person per day	-	-	-	51	52.1	45.8	62.0	68.1
% HHs using more than 15 litres per person per day	-	-	-	18.6	16.0	23.6	30.0	10.4
% HH using undesignated open area for defecation	67.7	75	76	45.4	50.9	74.3	72.4[17]	87.8
% HHs using latrine for defecation	19	23.7	17	16.8	15.6	17.2	12.1[18]	11.7
% HHs who wash their hands after defecation	43.2	17.4	29.3	28.6	30.8	46.3	-	43.2
% of HHs with a designated hand washing area with soap or ash available	-	-	-	-	-	25.8	41.3[19]	17.4

[16] From the 2006 to the 2012 survey this data was analysed for % HHs taking <1 hour to collect water, round trip but from the 2014 survey the data was analysed for the proportion of households with <30 minutes to walk to the nearest improved water source

[17] Due to survey design, households using an undesignated or designated open area for defecation.

[18] Percentage of households using their own latrine for defecation.

[19] A combination of observation and reporting.

Recommendations

The following recommendations are to be applied during 2015.

1. To scale up WASH work on sanitation and latrine use, including undertaking two barrier analysis, one on the reluctance to use latrines and the other on the reluctance to have designated hand washing facilities with soap.

2. To contribute to a reduction in the prevalence of GAM by increasing household food production, focusing on crops that will address the micro-nutrient deficiencies in diet, and to conduct a barrier analysis to understand the barriers limiting exclusive breastfeeding.

3. Focus on building more community ownership and supporting communities to develop and implement their own ideas in response to key issues found in the MICS results.

4. Increase the uptake of preventative services through greater community engagement in Agok.

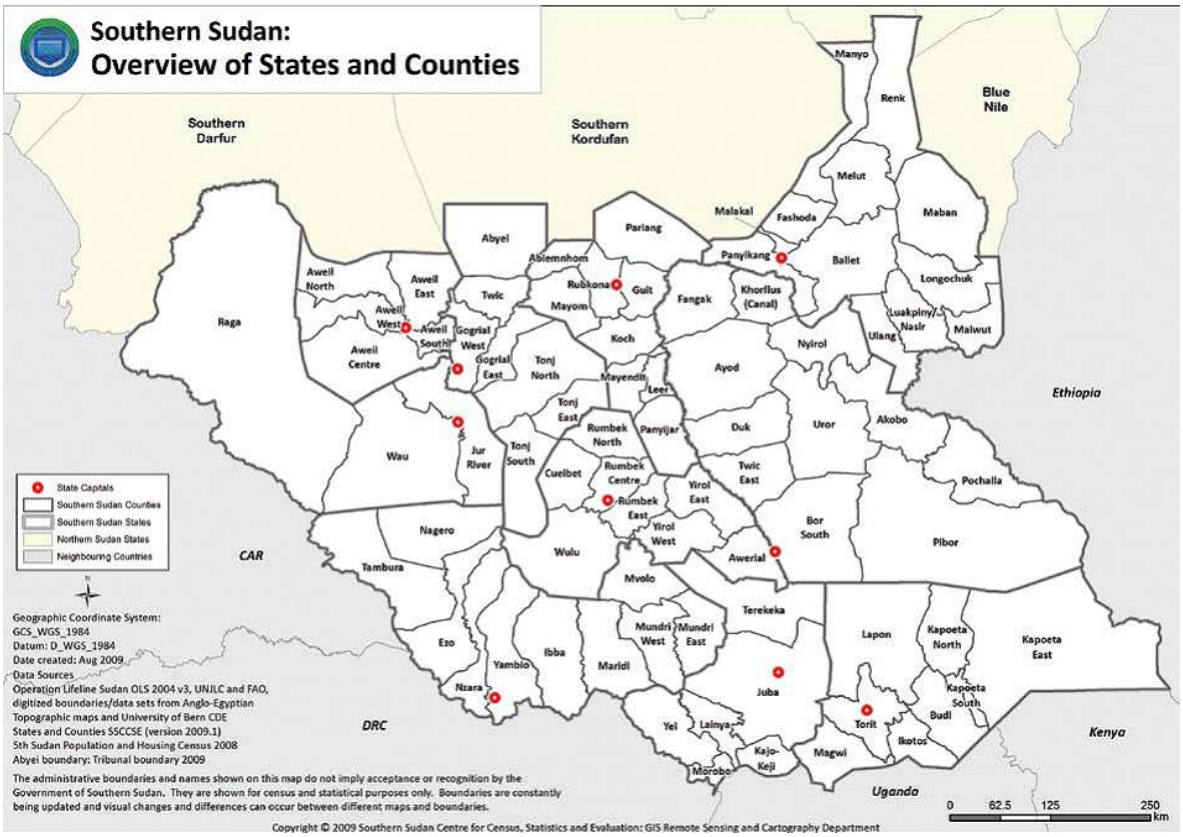
5. Conduct DBCs to understand the barriers to ANC, PNC, FP and TT uptake in Agok.

6. Discuss CLTS approach among agencies working in Agok and agree on a collaborated approach with support through the Wash Cluster should improve possibilities of success of this intervention.

1 Background

Abyei Administrative Area (AAA), an area of 10,460 km² borders South Kordofan to the north, Twic County (in Warrap State) to the south, Unity State to the east and Aweil East County (Northern Bar-el Gazal State) to the west. For maps showing Abyei's location follow the links in the footnote. The Area comprises of five payams, namely Rumamer, Mijak, Awal, Amethaguok and Abyei. These five payams are then divided into nine (Dinka) chiefdoms; Abior, Bango, Alei, Achueng, Mareng, Anyiel, Achak, Manyuar and Del.

Figure 1: Map of The Republic of South Sudan[20]



An accurate population figure is difficult to determine, but based on the most recent figures released by the UN cluster system, the total population for AAA is estimated at 86,269 with an additional 6,700 IDPs from Abiemnhom. Abyei is the main town in the AAA. The infrastructure in AAA is poor with no sealed roads, little electricity and few schools or health facilities[21]. Agok, in Rumamer payam, is the most largely populated town and is located south of Abyei town.

The AAA is inhabited by the Dinka Ngok communities, composed of the nine chiefdoms. The largest section is Diel, which occupies Rumamer, followed by Abior and Manyour. Dinka still practice an agro-pastoral lifestyle with migrations determined by climatic conditions that induce periodic floods and droughts throughout the area. Dinka grow millet, sorghum, corn, and other grain products. The cultivation time begins in May and harvest of crops takes place July-October.

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20 https://www.google.co.uk/search?q=map+of+Abyei+south+sudan&espv=2&biw=1440&bih=799&tbm=isch&imgil=2fUO8PoeIUwNVM%253A%253BCxHr9l46Cfi2JM%253Bhttp%25253A%25252F%25252Fwww.bbc.co.uk%25252Fnews%25252Fworld-africa-13502845&source=iu&pf=m&fir=2fUO8PoeIUwNVM%253A%252CCxHr9l46Cfi2JM%252C_&usg=__bu6C0pIx5TFjt2UFVWIOxfAjsmI%3D&ved=0CDMQyjc&ei=_-UGVfacIoSuOLTPgPAC#tbm=isch&q=map+of+south+sudan+counties&imgdii=_&imgrc=oucjOQY18zl10M%253A%3BUBCJOcQ3rgqyFM%3Bhttps%253A%252F%252Ferininjuba.files.wordpress.com%252F2011%252F03%252Fsouth-sudan-map-counties1.png%3Bhttps%253A%252F%252Ferininjuba.wordpress.com%252Fmaps-of-south-sudan%252F%3B951%3B671 – sourced 16th March 2015 14:24

21 Only nine health facilities exist in the area, mostly managed and operated by NGOs.

Dinka are known best, however, as cattle keepers, although they also may herd sheep and goats, fish and till the soil. Cattle are the mainstay of Dinka life and culture, indicating wealth and providing a dowry for marriage in addition to life giving sustenance. Cattle give milk (butter and ghee), urine is used to wash in order to dye hair and tanning hides. Cow dung fuels fires from which ash is used to keep the cattle clean and free from ticks, to decorate the Dinka themselves, and as a paste to clean teeth. In Dinka culture, cows are not normally killed for meat but if someone dies in the family then the cow is killed to have meat for the mourning time.

The Dinka family members provide an essential support network. Each family group lives in its own cluster of grass and sapling huts, placed around a communal cooking hearth. The family's cattle are tethered around its own site. Blood links extend out to clan members (all the descendants of a single ancestor) and there is the sense that blood relatives will unquestioningly support each other, the closer the blood link, the more automatic and total the support.

The Dinka believe in a universe single God, whom they call Nhialic. They believe Nhialic is the creator. They have rejected outright attempts to convert them to Islam by the Muslims from Sudan. But have been somewhat open to Christian missionaries and approximately 4-8% practice Christianity[22].

The Misseryia are primarily a nomadic tribe originating from the area of Western Sudan across into Eastern Chad. The Misseryia are now divided into three areas, each independent of each other. The Misseryia who migrate south into the Abyei area[23] are from Southern Kordafan on the fringes of the semi desert area but their migratory area spreads well south into the flood plains of the White Nile. The Misseryia speak Arabic, are Muslims and associate themselves with Sudan whereas the Dinka Ngok associate themselves with South Sudan. Both tribes lay claim to the Abyei area.

AAA has one rainy season which stretches from April/May to November. The highest rainfall peak is in August and September. The population practices agriculture and livestock production. The area is heavily dependent on agriculture, though a successful harvest is dependent on rainfall. Short-term sorghum is the main crop grown in the area, while maize and long term sorghum is grown on a small scale. A few households also grow some sesame and groundnuts. May through to August is considered the hunger gap period.

The area is rich with various and important resources. The existing land and water resources combined with normal climatic conditions favour crop and livestock production in addition to fishing activities. The area also contains oil resources.

Abyei, lying on the border between the Sudan and the Republic of South Sudan and encompassing important oil fields has seen more than its fair share of insecurity and population displacement and has a long and turbulent history throughout the former civil wars and remains a critical area in the Comprehensive Peace Agreement signed in 2005 by the Sudanese Peoples Liberation Movement (SPLA) and the Government of Sudan (GoS) marking the end of Sudan's second civil war between the North and the South. The CPA was meant to end the civil war, develop democratic governance countrywide and share oil revenues. Abyei was designated as an exception to the CPA and the AAA was created to govern the area on 9 January 2005. The CPA further set a timetable by which South Sudan (SS) and AAA would have a referendum on its independence for SS and the country where AAA would want to belong to. While the SS referendum was conducted timely, disagreement between Sudan and South Sudan on who constitutes an Abyei resident and border demarcation hadn't been resolved hence postponement of the AAA referendum indefinitely.

The civil war and insecurity have marginalized the Dinka Ngok community, and the population has become a victim of the current political situation yet again. The previous and subsequent insecurity has resulted in on-going displacement which has had a significant effect on households' access to food. Looting and destruction have reduced access to home-grown grain crops and other food crops.

In October 2007, rising tensions between the SPLA and GoS resulted in the SPLA temporarily withdrawing from the Government of National Unity (the new name for the GoS following the signing of the CPA) over several deadlocked issues, notably Abyei. Armed violence erupted in the Abyei region during late 2007 and

[22] http://www.wydasudan.org/dinka-tribe

[23] The Missaryia have grazing rights to the River Kirr in Abyei

through February and March 2008. Clashes occurred both between the SPLA and Misseryia fighters[24] and between the SPLA and government troops.

Following the violence of February and March 2008, the Sudanese government deployed a contingent of soldiers to Abyei town at the end of March 2008. Armed clashes between these troops and the SPLA occurred during May 2008 resulting in dozens of deaths and the displacement of an estimated 25,000 civilians. Much of Abyei town was razed and most of the population fled north or south of Abyei town.

Following the clashes in Abyei during May 2008, the Sudanese President and the President of the Government of Southern Sudan, in June 2008, agreed to refer the disputes between the Government and the SPLM/A concerning the determination of the Abyei area's boundaries to the Permanent Court of Arbitration in The Hague. As a result the northern, eastern and western boundaries were redrawn, thus decreasing the size of Abyei. The size of Abyei was crucial to the political dispute, as the CPA stipulates that its residents would be able to vote in the referendum on whether to become part of northern or southern Sudan. The redrawn borders give control of the richest oil fields in the Abyei region to the north while at least one oil field went to the south. Most of the Misseryia are outside of the redrawn borders.

On 9 July 2011, the people of Southern Sudan voted in a referendum (AAA was excluded) to decide whether or not to split from Sudan. The result was overwhelmingly in support of Independence and thus the Republic of South Sudan was created. The referendum that was scheduled for AAA residents on 9 January 2011 was delayed indefinitely as the Dinka Ngok and Misseryia continue to engage in territorial disputes. As of January 2012, despite efforts including external mediation regarding the AAA, the new border has not yet been demarcated and there is still no agreement on who constitutes a "resident of Abyei[25]" for the purposes of voting in the Abyei referendum.

May 2011 saw the eruption of another Abyei crisis as SAF militarized the area to take control of Abyei town resulting in the displacement of approximately 100,000 people, according to the RRC.

After long waiting and no resolution between Sudan and South Sudan, Dinka Ngok held a unilateral referendum in October 2013 whereby 99.98% of the 64,775 Ngok Dinka who participated, voted in favour of joining South Sudan. This vote has not been recognised by the international community and more importantly by the governments of both Sudan and South Sudan.

Constant and prolonged insecurity has discouraged humanitarian agencies from operating in the AAA to address the needs of the communities. Those who do work in the area were caught up in the insecurity in 2008 and 2011 and had to flee from Abyei, most are now located around Agok, South of Abyei including GOAL.

1.1 GOAL Programme Activities

The GOAL programme in AAA works in the areas of primary health care (PHC), water, sanitation and hygiene (WASH), livelihoods, adult education and emergency response.

Primary Health Care (PHC)

GOAL's PHC programme includes the provision of the following components:

- Curative Care
- Health promotion
- EPI and child health
- Reproductive health care
- Nutrition
- WASH
- Response to outbreaks of communicable diseases
- Capacity building of local staff and relevant stakeholders

[24] Messiria leaders had objected to demarcation provisions of the CPA which they claim have a negative impact upon Messiria access to grazing lands.

[25] Any further use of the term 'Abyei' is indeed referring to the Abyei Administrative Area, unless otherwise noted.

Livelihoods

The livelihood programme started in 2006, alongside the nutrition response, with the aim of increasing local food production. The components of the programme are:

- Strengthening farmers capacity on food production;
- Encourage farmers to engage in crop diversification;
- Development of the IPSE farmers approach from 2007 and set up a series of demonstration farms (currently one), sensitize and encourage local communities to adopt improved farming techniques;
- Provision of seeds, seedlings, tools and training, through the demonstration farms and tree nurseries, while the community provide labour and manage the plots;
- Support to a number of innovative farmers in growing some improved varieties of cash crops aiming at promoting the change from purely subsistence agriculture to an integration of small-scale commercial agriculture into the small-scale production systems.
- Support of Village Savings and Loans Associations (VSLAs).

REFLECT

REFLECT is an innovative approach to adult learning and social change building on literacy and numeracy skills through community development projects.

The Reflect methodology groups participating women into "circles". Within circles of typically 25 women, literacy, numeracy and business management skills are learned around subject matters promoting the welfare of their communities, their families and themselves. Participants determine the subjects to be covered, as well as meeting times and places. Developing these skills, women gain confidence, and the communities gradually come to view them differently. In this approach, there are no textbooks; instead, a locally devised manual that is comprised of units relevant to the needs and interests of the beneficiaries and based on a local analysis of a socio-economic and socio-cultural survey of the area. Each unit deals with a subject related to community life and starts with the construction of a pictorial representation such as a map, matrix, calendar or diagram, reflecting for example, income levels or household distribution.

Participants are encouraged throughout to take a leadership role within the circle as well as in community based organizations and activities. The circles and the women in them then begin to participate in decisions that affect their families and communities. At the end of year one, a leader is elected from the participants in each circle. This leader is tasked to work with the circle facilitator during the second year and at the end of the second year, this leader will take over the role of the facilitator. The facilitator will support on-going meetings and motivate participants to practise the literacy skills that they have gained. Formal support is provided for two years or more, evolving toward a self-sustaining structure as external support is phased out. REFLECT beneficiaries are supported with livelihoods training in Year 2 and supplied with seed capital.

Three final circles of the initial 10 circles are due to graduate in March 2015 and plans to recruit more are under way. The Reflect circles are supported to form VSLAs during the training phase.

1.2 Other Agencies currently working in Abyei

MSF Switzerland operates inpatient clinics and an inpatient therapeutic care centre in Juljok. In 2011 they opened a new surgical unit at their hospital in Juljok.

Save the Children-Sweden is the sector lead in NFI and joint- sector lead in child protection.

Mercy Corps main activities are livelihoods, governance and strengthening of CBO's. In addition Mercy Corps have established internet and IT training centres in Abyei town and Juljok.

Abyei Community Actions for Development (ACAD) was established in February 2001. ACAD is a community initiative and response to address rehabilitation and development needs through people's own actions and resources. The idea behind the establishment of ACAD was as a result of genuinely felt needs by communities for a local agency to facilitate and mobilize the communities. It is currently operating community development activities with various components e.g. water, human rights, child protection and conflict resolution and peace building between Dinka Ngok and Misseryia. It implements the activities in partnership with WFP, UNICEF and UNDP.

The World Food Program (WFP) provides food aid in the form of a general food distribution (GFD), which

currently includes three month half rations.

CARITAS is involved in WASH activities.

WHO coordinates health service delivery; currently there are no staff in AAA and they are supporting the region from South Kodofan.

UNISFA is a security force formed by the UN Security Council to monitor and maintain peace within the AAA PCA box.

UNOCHA is a UN Coordinating body based in AAA.

2 Objectives of the survey

2.1 Overall objective of the survey

- To identify the current situation in the GOAL operational areas in terms of retrospective mortality, health, water, sanitation and hygiene (WASH), HIV, nutrition and food security and livelihoods**.**

2.2 Specific objectives

- To assess the overall prevalence of malnutrition in the survey area;
- To estimate the immunization coverage of measles, Penta3 and vitamin A supplementation of children under five years of age in the survey area;
- To estimate retrospective under-five and crude mortality rates in the three months prior to the survey time;
- To assess the morbidity of children under five years during the two weeks prior to the survey time and treatment seeking practices;
- To assess infant and young child feeding practices among children less than 24 months of age;
- To assess household conditions of health, water and sanitation, and livelihood issues in the survey area;
- To compare the situation in the survey areas to the previous years;
- To make recommendations to assist in present and future programme planning.

3 Methodology

3.1 First stage of sampling: Sampling procedure and sample size for anthropometric and mortality data

A two-stage cluster survey was conducted from 12th to 21st February 2015, covering accessible areas of AAA south of the river Kiir and Abyei town.

The survey was designed using SMART[26] methodology (43*10) with probability proportional to size at the first stage of sampling. Based on the most recent figures released by the UN cluster system, total population for Abyei is estimated at 86,269 with an additional 6,700 IDPs from Abiemnhom. The under-five year old population estimated at 19%[27]. Of the total 76 villages, 43 were selected for inclusion in the survey area and there was no reason to exclude any of these and therefore all were included in the sampling frame.

Clusters were selected using ENA for SMART, January 15 2015 version. The villages included in the sample frame were entered into the programme with their population numbers. The SMART software then randomly assigned clusters, with the chance of each village being chosen being proportional to its population size. Using this technique allows every household the same probability of being selected. In order for a survey to be truly representative, every member of the population must have an equal chance of being chosen. Forty three clusters and five reserve clusters were selected at this stage (see Appendix 2).

[26] Standardized Monitoring and Assessment of Relief and Transitions, May 2011, M. Golden et al

[27] Based on the estimated percentage of children aged 6-59 months.

Calculating sample size for anthropometric data

Sample size was calculated using ENA software, with an expected 20.6% prevalence of malnutrition which was found in the January 2012 GOAL survey. A standard 5% precision was used, with a design effect of 1.5 to compensate for similarity within clusters. An average household size of 6.0[28]. Under-five year old children were estimated at 19% of the population. Five percent was then added for non-response households, giving a sample size of 410 children, estimated to be found by visiting 421 households. This meant that the teams were required to visit 9.5 households, rounded to 10 households, per cluster to obtain an adequate sample size.

Calculating sample size for mortality data

Two-stage cluster sampling was also used to estimate mortality rates. The same clusters were used for mortality as were used to estimate malnutrition. Sample size was calculated using ENA software, with a total population of 86,269 an estimated prevalence of 0.41, the CMR found in the January 2012 GOAL survey, a precision of ±0.35/10,000/day, and a design effect of 1.5. The average household size was entered as 6.0[29]. Mortality rates were estimated using a recall period of 90 days, the recall period was between second weeks of November 2014 to 12th February 2015. On top of this 5% was entered for potential non-response households, giving a sample size of 2333 people, estimated to be found by visiting 409 households.

However as both the anthropometric and mortality data was collected from the same clusters the higher sample size of 421 households was taken for both anthropometric and mortality data and 10 households were visited per cluster.

3.2 Second stage of sampling: selection of households and children

Selection of households

Probability proportion to size (PPS) together with segmentation was used to randomly select households/sampling units in the field.

Upon arrival at the randomly selected village, the village chief was found and introductions made and the purpose of the survey explained. Segmentation was used depending on the size of the village. Large villages were segmented while the smaller villages were assessed completely. The team then listed all the households residing in the village with the help of the village chief or representative. After drawing up the list of the households and assigning each household a number, 10 households between 1 and the last number which correspond to the list of households were selected by using a Random Number Table for the simple random sampling method. Then the teams would start with any convenient randomly selected household to carry out the survey without substituting absent or refusal households. If a household was not at home when the survey team passed, they noted the household name and number and returned later.

Selection of children

In every household visited the mother/caregiver was interviewed. If there were children between 0 - 59 months old in the household the child health and child feeding questionnaire was administered, as well as the other household indicator questions. All eligible children aged between 6 and 59 months in each visited household were included for the anthropometric questions. If a child was missing, the survey team returned to the household to check for the child later in the day. There were 50 children that remained absent after the teams returned to all the households.

[28] Because we anticipate significant population movement since the 15 December 2013 conflict, we are using an estimated household size of 6 people. The 2012 SMART survey had placed the household size at 8.5.
[29] Ibid

Reserve clusters / Problem clusters

Five reserve clusters were identified by the ENA software but none were required. All clusters originally identified were surveyed.

One cluster, Cluster 38, was surveyed but there was then a problem downloading the data from the digital devices. Technical experts were asked if they could assist with the extraction of the data but the data could not be extracted before the analysis had to take place, therefore this data (from seven households) could not be included in the data analysis.

Despite the missing data, data was collected for a total of 409 children (one child less than the sample required) and 2729 people (396 more than the original sample required).

3.3 Training

The total number of survey participants trained were 20 of the GOAL programme staff from nutrition, livelihood, WASH and clinic and health promotion sectors. Training was conducted for five days, including a field test, and training covered survey objectives, basic malnutrition, concept of sampling and SMART survey methodology followed by anthropometric measurements, recognition of the signs and symptoms of malnutrition including nutritional bi-lateral oedema and how to fill the questionnaire and how to interview households.

As a means to verify anthropometric skills of enumerators and to detect differences among measurers a standardization test was given during the fourth day of the training. Nine children were measured once by the survey supervisor and then each of the 15 enumerators were allowed to measure the children's weight, height and MUAC twice with a time interval between individual measures. Finally, 12 enumerators were assigned as measurers and assistant measurers based on the results of their measurement evaluation, result and merit, commitment and performance shown during training. The remaining three were assigned as translators.

The pilot survey was conducted in an area which was not selected for the survey. Observations of errors in the performance of each team with regards to undertaking measurements and completing the questionnaires were identified, discussed and corrected with all team members by the team supervisors and the Survey Manager.

Training was carried out by GOAL's Survey Manager and was conducted in English and the local language. Five teams were formed, each consisting of an interviewer, two measurers and a supervisor who was responsible for ensuring the recording of all data collected as well as ensuring accuracy of measurements taken, methodology and any other technical issues raised while in the field.

3.4 Data collected

Four questionnaires were used to collect the data: a mortality questionnaire asked in all households, a anthropometric questionnaire asked for all children 6-59 months, a child health and feeding questionnaire for all children between 0-59 months; and a household questionnaire asked at all households containing children less than five years, which includes WASH, livelihoods, and health.

3.4.1 Mortality data

The survey team collected data for the mortality questionnaire in every household visited regardless of whether there were children less than five years or not. Information collected included:

- Total number of people in the household
- Number of children under five years
- Number of people who left the household within the recall period (total and under five years)
- Number of people who joined the household within the recall period (total and under five years)
- Number of births in the household within the recall period
- Number of deaths in the household within the recall period (total and under five years)
- Cause of deaths

3.4.2 Individual information per survey child - Anthropometric data

- Sex
- Age (in months) determined using a local events calendar (Appendix 3)
- Weight (in kilograms) measured to a precision of 0.1 kg using hanging 25 kg Salter scales (children 6-59 months only)
- Height (in centimetres) measured to the nearest 0.1 cm using length/height boards. Children <87 cm were measured lying down (children 6-59 months only).
- Presence of bilateral pitting oedema on both feet after three seconds of pressure
- MUAC, to the nearest millimetre
- Admission to nutrition feeding programme

3.4.3 Individual information per survey child - Child Health and Feeding

- Vaccination status for measles and Pentavalent 3, based on documentation on the child's under-five card or verbal confirmation
- Vitamin A supplementation status in the past six months (children age 6-59 months only, by showing vitamin 'A' capsule)
- Child morbidity in the past two weeks before the survey and health seeking practices
- Child LLITN use the night before the survey
- Initiation of breast feeding
- If the child is currently breast feeding
- What did the child eat the day before the survey
- What did the child drink the day before the survey
- Feeding practices during illness
- Number of meals the child had the day before the survey.

3.4.4 Household information

Data for the household questionnaire was collected in every household visited with children less than five years. Information was collected on the following areas:

- Household demography
- Household livelihood and food security
- Income sources
- General health, reproductive health and HIV
- Water, sanitation and hygiene services and practices

3.5 Survey implementation

The training took place between 6th to 11th February 2015, while the field work was conducted from the 12th to 21st February 2015. Five teams were formed to carry out the survey, each consisting of four people:

- One team leader, who was responsible for overseeing the team's activities, quality of the field work, survey methodology and completion of the data needed before leaving the field, including accurate capturing of the data on the questionnaires.
- One translator, who was responsible for accurately translating the questions for the local respondents and providing the answers to be recorded.
- Two anthropometric measurers who carried out weight, height and MUAC measurements and checked for the presence of oedema.

3.6 Data analysis

Anthropometric data was collected for 409 children and was checked for outliers (values that lie +/-3 SD from the observed mean). Outliers were flagged by the SMART software as not being plausible values of either weight, height or age therefore the SMART flags were excluded from the analysis as seen in Table 1 below (see Appendix 6, Table 51 for the mean z-scores, design effects and excluded subjects for the NCHS Reference, 1977). Therefore, weight-for-height data was analysed for 403 children, weight-for-age for 405 children, and height-for-age for 398 children aged 6-59 months using ENA for SMART (January 2015 version).

Table 1: Mean z-scores, design effects and excluded subjects (WHO Growth Standards, 2006)

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	403	-1.17±0.98	1.12	3	3
Weight-for-Age	405	-1.37±0.94	1.47	2	2
Height-for-Age	398	-1.10±1.07	1.32	0	11

* contains for WHZ and WAZ the children with oedema.

Health data was analysed for 199 children and infant feeding data was analysed for 116 infants between 0-23 months using Excel. Household data was analysed for 213 households using Excel. Mortality data was analysed for 2,729 people using ENA for SMART to calculate mortality rate. The plausibility report generated by SMART (Appendix 7) scored the overall survey at 3% which means that the quality of the data is excellent.

Interpreting the data

The MICS survey is a cross-sectional study that generates descriptive data such as the prevalence of malnutrition by taking a 'snapshot' at one point in time for one location, in this case for GOAL's operational area in Abyei in February 2015. When prevalence's are presented, the denominator is also presented in this report as "N". Cross-sectional studies are helpful for looking at relationships among different variables (by using different statistical tests) for example the difference in the level of malnutrition in female versus male-headed households. The statistical tests determine if the difference in figures amongst variables is far enough apart to really be a 'significant' difference where one can see a trend developing. Simply, this significant difference is shown throughout this report by the p-value, which if less than 0.05 means that there is a significant difference and 95% confidence intervals (CI) are used to judge the statistical precision of point estimates, whereby the more precise the estimate, the tighter the CI. Where means are presented throughout the report, a standard deviation (SD) will be presented which is the measure of spread around the mean.

Cross-sectional studies are also helpful by making generalizations about the characteristics of the population as a whole by collecting data from a random representative sample with a big enough sample size. To be able to generalize about the population in Abyei, 95% CI's are also produced, which tell the reader the range in which the real value for Abyei lies between 95 out of 100 times if one were to repeat the same survey 100 times. The actual prevalence that is presented is the value that the sample generated, which falls within the confidence interval, but the real population value is always unknown other than the range produced by the confidence interval.

Cross-sectional studies, however do not provide causal information or insight into temporal relationships, i.e. whether the exposure preceded or followed the outcome, as both are measured at the same time, such as if one were measuring wasting and illness, did the illness occur before the wasting started or after? These are the limitations of cross-sectional studies and so one should read the report with caution when looking at variables that are significantly associated and not assign causality.

3.7 Classifying malnutrition

Weight-for-height

Weight-for-height z-scores (WHZ) were calculated to give the prevalence of acute malnutrition or wasting. Wasting can be assessed by comparing a child's weight with the weight that would be expected from a healthy child of the same height and sex. For the purposes of this report, the WHO Growth Standards, 2006 which have been adopted in North Sudan is used as the healthy comparison group to ensure comparison from previous years and across country surveys to obtain z-scores.

A z-score is a measure of how far the child deviates from the mean WHO or NCHS record for his age or height, and therefore a measure of how well he is growing compared to the 'norm.' Prevalence of malnutrition according to the formally used NCHS Reference population, 1977 were also analysed and are presented in Appendix 6. As seen below wasting is defined as <-2 z-scores (global acute malnutrition), whereas severe

wasting is defined as <-3 z-scores (severe acute malnutrition)[30].

Table 2: Wasting as defined by WHO

Global Acute Malnutrition (GAM) Moderate & severe wasting	<-2 z-scores / <80% median weight-for-height (WFH) and/or oedema
Severe Acute Malnutrition (SAM) Severe wasting	<-3 z-scores / <70% median weight-for-height (WFH) and/or oedema

Mid-upper arm circumference (MUAC)

The MUAC increases in size during the first six months of a child's life quite significantly, but relatively little between the ages of 1-5 years. At birth an infant's upper arm circumference is about 105 mm. By the age of one year, it will have grown on average to about 165 mm. Over the next four years until the child is five years old, the circumference only grows about 10 mm to 175 mm at the most[31]. Any child aged between 1-5 years whose arm circumference is less than 125 mm may be acutely malnourished and less than 115 mm severely malnourished. MUAC is a simple and important tool as it is the best predictor of those cases most at risk of dying once the MUAC falls below 115 mm; however it is not a sensitive early predictor of malnutrition[32]. In recent years MUAC has been adopted for use on infants from six months.

Height-for-age

Height-for-age z-scores were calculated to give the prevalence of chronic malnutrition or stunting. Stunting can be assessed by comparing a child's height with the height of a healthy child of the same age. Stunting is an index of long-term nutritional deprivation where growth is being compromised to conserve nutrients and energy for the maintenance of the body. It is also necessary to know the exact age of the child to accurately determine stunting which was a limitation of this survey therefore this data should be interpreted with caution. Even though an events calendar was used when estimating each child's age to the nearest month SMART rated the quality of the age data as unacceptable. As seen in the Table below, stunting is defined as <-2 z-scores, whereas severe stunting is defined as <-3 z-scores.

Table 3: Stunting as defined by WHO

Global Chronic Malnutrition Global Stunting	<-2 z-scores / <90% median height-for-age (HFA)
Severe Chronic Malnutrition Severe Stunting	<-3 z-scores / <80% median height-for-age (HFA)

Weight-for-age

Weight-for-age z-scores were calculated to give the prevalence of under nutrition or underweight. Underweight can be assessed by comparing a child's weight with the weight of a healthy child of the same age. It is also necessary to know the exact age of the child to accurately determine underweight which was a limitation of this survey; therefore this data should be interpreted with caution. Even though an events calendar was used when estimating each child's age to the nearest month SMART rated the quality of the age data as unacceptable. Underweight is defined as <-2 z-scores, whereas severe underweight is defined as <-3 z-scores.

Population cut-offs for malnutrition

The Table below defines the population cut-offs for determining the severity of the malnutrition when the prevalence of acute and chronic malnutrition is known. These levels are internationally agreed upon and provide an objective basis for developing responses to increased levels of acute and chronic malnutrition[33].

[30] Z-score criteria always yield a greater prevalence of malnutrition than use of the percent of median criteria. This is because the former takes into account variation in the standard deviation of weight at different heights, making it more statistically valid. For this reason WHO recommends use of z-scores for the presentation of malnutrition prevalence.

[31] Health link Worldwide. Growth monitoring Health Basics. Diarrhoea Dialogue online. March 1986: 24

[32] WHO/UNICEF. WHO child growth standards and the identification of severe acute malnutrition in infants and children: A joint statement. 2009.

[33] Physical Status: The use and interpretation of Anthropometry. Report of a WHO expert committee, 1995. Chapter 5, p208 & 212

To interpret proportions at a population level with meaning, absolute numbers are also necessary (i.e. 8% of a large population will be many more than 15% of a small population).

Table 4: WHO population cut-offs for chronic and acute malnutrition

Index	Normal/Low	Poor/Medium	Serious/High	Critical/Very high
Global Underweight	<10%	10-19.9%	20-29.9%	>30%
Global Chronic Malnutrition	<20%	20-29%	30-39%	≥40
Global Acute Malnutrition	<5%	5-9%	10-14%	≥15
(GAM) Mean weight for height z-score	>-0.40	-0.40 to –0.69	-0.70 to –0.99	≤-1.00

Assessing acute malnutrition in pastoralist populations

Abyei Administrative Area is primarily made up of the Dinka, pastoralist and agro-pastoralist populations who have different body shapes (longer legs, shorter sitting heights) as compared to agrarian populations. It is important to note that the NCHS reference and WHO standards are based on the body shapes of agrarian children and there is debate whether this is an appropriate comparison group as well as whether it will affect levels of malnutrition in pastoralist populations. The WHO however, maintains that all children under five demonstrate similar growth (weight-to-height ratio)[34] and that differences in body shape do not become evident until after five years, therefore in theory the growth standards should also be a comparable group to assess nutritional status in pastoralist populations. Interestingly however, recent research by Myatt has shown that MUAC may be a more robust indicator of acute malnutrition than weight-for-height in pastoralist populations. Myatt concludes that: *Some of the difference in levels of wasting in children aged between 2-5 years may be due to differences in growth or body shape rather than differences in actual nutritional status*[35]*.* Children in pastoralist communities had on average a significantly lower Cormic Index (or sitting height to standing height ratio) than children in agrarian populations. This had the effect of overestimating the prevalence of wasting measured by weight for height in this age group. Myatt's work showed that levels of wasting measured by mid-upper arm circumference (MUAC) on the other hand were not associated with sitting height to standing height ratio.

This debate is still ongoing, therefore as a compromise until further research is released, it is also important to note the prevalence of malnutrition according to MUAC in addition to weight-for-height in this report.

[34] de Onis M. Garza C et al. (2003). The WHO Multicentre Growth Reference Study: strategy for developing a new international growth reference. Forum Nutrition. 56; 238-40.

[35] Myatt, M. (2007). Report concerning the analysis of data collected for the MUAC/weight-for-height/body-shape research study. London. Division of Epidemiology. Institute of Ophthalmology, University College London.

4 Results

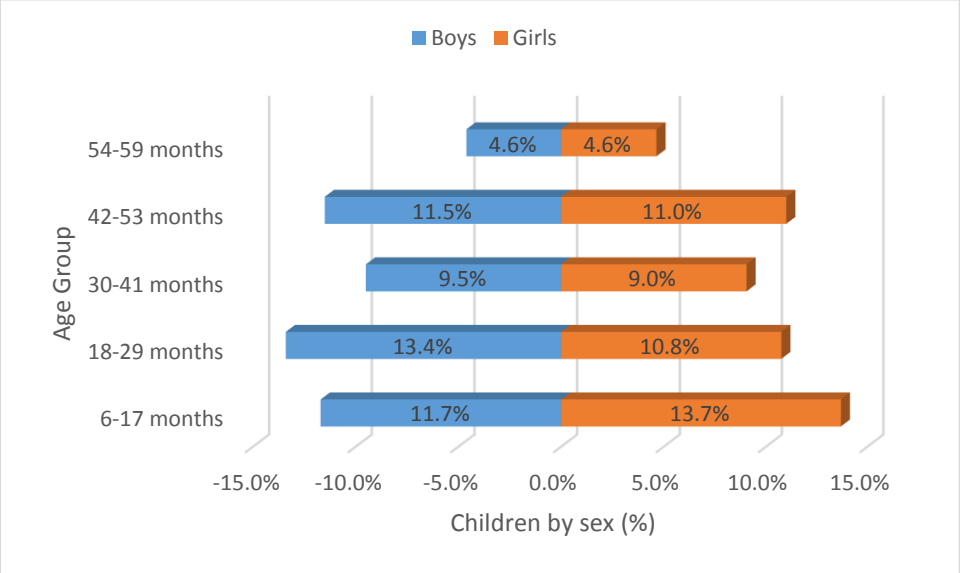
4.1 Sample population

The overall sex ratio (p-value = 0.729) showed that boys and girls were equally represented in the sample. The over-all age distribution (p-value = 0.366), age distribution for boys (p-value = 0.581) and girls (p-value = 0.493) and the overall sex/age distribution (p-value = 0.173) were all as expected.

Table 5: Distribution of age and sex of sample[36]

	Boys		Girls		Total		Ratio
AGE (months)	**no.**	**%**	**no.**	**%**	**no.**	**%**	**Boy:girl**
6-17	48	46.2	56	53.8	104	25.4	0.9
18-29	55	55.6	44	44.4	99	24.2	1.3
30-41	39	51.3	37	48.7	76	18.6	1.1
42-53	47	51.1	45	48.9	92	22.5	1.0
54-59	19	50.0	19	50.0	38	9.3	1.0
Total	208	50.9	201	49.1	409	100.0	1.0

Figure 2: Population age and sex pyramid



[36] SMART Training Tools: Survey Manager Training Module 7, Annex 7.4: Group 1 = 6-17 months = 23.2%; Group 2 = 18-29 months = 22.6%; Group 3 = 30-41 months = 21.9%; Group 4 = 42-53 months = 21.6%; Group 5 = 54-59 months = 10.7%.

4.2 Anthropometric indices (WHO standards 2006)

4.2.1 Acute malnutrition

Table 6: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex (WHO, 2006)

	All n = 403	**Boys** n = 204	**Girls** n = 199
Prevalence of global acute malnutrition (<-2 z-score and/or oedema)	(79) 19.6 % (15.7 - 24.2 95% C.I.)	(44) 21.6 % (16.7 - 27.4 95% C.I.)	(35) 17.6 % (12.7 - 23.9 95% C.I.)
Prevalence of moderate acute malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(67) 16.6 % (12.9 - 21.2 95% C.I.)	(40) 19.6 % (14.7 - 25.6 95% C.I.)	(27) 13.6 % (9.2 - 19.5 95% C.I.)
Prevalence of severe acute malnutrition (<-3 z-score and/or oedema)	(12) 3.0 % (1.7 - 5.2 95% C.I.)	(4) 2.0 % (0.7 - 5.1 95% C.I.)	(8) 4.0 % (1.9 - 8.2 95% C.I.)

The prevalence of oedema is 0.0 %

Between boys and girls there is no significant difference in the prevalence of GAM and SAM (p-value = 0.3373 and p-value = 0.2463 respectively) indicating that both are at equal risk of malnutrition.

When comparing these results to GOAL's January 2012 survey the GAM shows no significant change (p-value = 0.7527; January 2012 GAM 20.6%, 95% CI 16.0-26.0), nor does the prevalence of SAM (p-value = 0.7025; January 2012 SAM 2.5%, 95% CI 1.4-4.4).

Figure 3: Frequency distribution of weight for height z-scores (WHO, 2006)

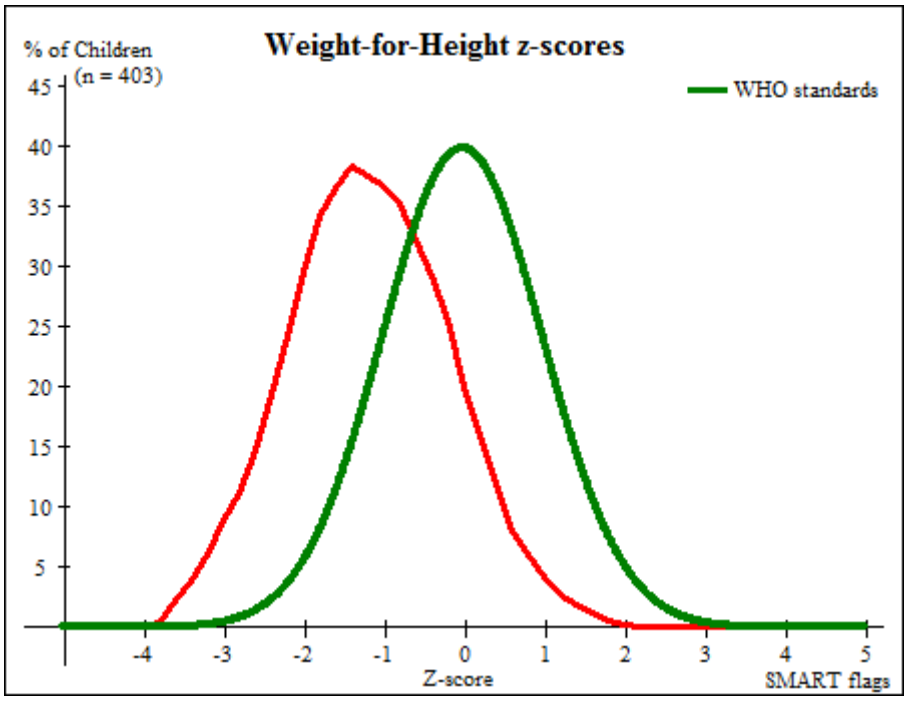


Figure 3 above shows the distribution curve of WHZ of the 403 sampled children shifted to the left of the reference population with a mean WHZ -1.17 (SD=±0.98) below the reference mean (zero), indicating that the population of the sample frame is malnourished compared to the reference population[37]. The standard

[37] SMART Methodology

deviation of the curve (±0.98) lies within accepted benchmarks (0.8 – 1.2)[38], showing accuracy of the measurements taken.

The skewness (0.12) lies within acceptable limits (-1 to +1 respectively) indicating that the distribution is symetrical. Kurtosis (-0.25) of the WHZ distribution is within accepted limits, showing a normal distribution of the z-scores.

The value of Index of Distribution (ID) in the plausibility check shows ID=1.03 and p-value = 0.409. According to the ID and p-value result, the malnutrition cases appear to be randomly distributed among the clusters indicating that the distribution is homogeneous as the p-value is between 0.05 and 0.95.

Table 7: Prevalence of acute malnutrition by age based on weight-for-height z-scores and/or oedema (WHO, 2006)

		Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Age (months)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	102	2	2.0	17	16.7	83	81.4	0	0.0
18-29	98	2	2.0	20	20.4	76	77.6	0	0.0
30-41	75	0	0.0	9	12.0	66	88.0	0	0.0
42-53	91	6	6.6	15	16.5	70	76.9	0	0.0
54-59	37	2	5.4	6	16.2	29	78.4	0	0.0
Total	403	12	3.0	67	16.6	324	80.4	0	0.0

When the prevalence of malnutrition is compared between the age groups there is no significant difference found between the 6-29 month and 30-59 month age groups either for global or severe acute malnutrition (p-value 0.6525 and 0.2517 respectively).

The GAM for the 6-29 month age group (N=200) is 20.5% (n=41) (95% CI 15.9-26.1) with a mean±SD of -1.19±0.96. SAM was 2.0% (n=4) (95% CI 0.7-5.4).

The GAM for the 30-59 month age group (N=203) is 18.7% (n=38) (95% CI 13.9-24.7) and a mean±SD of -1.16±0.99. SAM was 3.9% (n=8) (95% CI 1.8-8.4).

Table 8: Distribution of severe acute malnutrition and oedema based on weight-for-height z-scores (WHO, 2006)

	<-3 z-score	**>=-3 z-score**
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 12 (3.0 %)	Not severely malnourished No. 394 (97.0 %)

[38] M. Golden et al (2006). Measuring Mortality, Nutritional Status and Food security in Crisis Situation: SMART Methodology

Table 9: Prevalence of acute malnutrition based on MUAC cut offs (and/or oedema) and by sex (WHO, 2006)

	All n = 409	**Boys** n = 208	**Girls** n = 201
Prevalence of global acute malnutrition (< 125 mm and/or oedema)	(37) 9.0 % (6.5 - 12.5 95% C.I.)	(14) 6.7 % (4.3 - 10.4 95% C.I.)	(23) 11.4 % (7.3 - 17.5 95% C.I.)
Prevalence of moderate acute malnutrition (< 125 mm and >= 115 mm, no oedema)	(33) 8.1 % (5.6 - 11.5 95% C.I.)	(13) 6.3 % (3.9 - 9.9 95% C.I.)	(20) 10.0 % (6.0 - 16.0 95% C.I.)
Prevalence of severe acute malnutrition (< 115 mm and/or oedema)	(4) 1.0 % (0.4 - 2.6 95% C.I.)	(1) 0.5 % (0.1 - 3.6 95% C.I.)	(3) 1.5 % (0.5 - 4.6 95% C.I.)

Table 10: Prevalence of acute malnutrition by age, based on MUAC cut offs and/or oedema (WHO, 2006)

		Severe wasting (< 115 mm)		**Moderate wasting (>= 115 mm and < 125 mm)**		**Normal (> = 125 mm)**		**Oedema**	
Age (months)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	104	2	1.9	16	15.4	86	82.7	0	0.0
18-29	99	1	1.0	12	12.1	86	86.9	0	0.0
30-41	76	1	1.3	1	1.3	74	97.4	0	0.0
42-53	92	0	0.0	4	4.3	88	95.7	0	0.0
54-59	38	0	0.0	0	0.0	38	100.0	0	0.0
Total	409	4	1.0	33	8.1	372	91.0	0	0.0

4.2.2 Chronic malnutrition

Table 11: Prevalence of stunting: height-for-age z-scores (WHO, 2006)

	All n = 398	**Boys** n = 204	**Girls** n = 194
Prevalence of stunting (<-2 z-score)	(74) 18.6 % (14.5 - 23.6 95% C.I.)	(49) 24.0 % (17.4 - 32.2 95% C.I.)	(25) 12.9 % (8.3 - 19.5 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(53) 13.3 % (10.1 - 17.4 95% C.I.)	(32) 15.7 % (11.0 - 21.8 95% C.I.)	(21) 10.8 % (6.8 - 16.8 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(21) 5.3 % (3.4 - 8.0 95% C.I.)	(17) 8.3 % (5.1 - 13.3 95% C.I.)	(4) 2.1 % (0.8 - 5.2 95% C.I.)

Prevalence of global stunting has not changed significantly (p-value = 0.0635) between this survey and the January 2012 survey nor has the prevalence of severe stunting (p-value = 0.0702). In the 2012 survey global stunting was found to be 24.1%, 95% CI 20.4-28.2, and severe stunting was 8.6%, 95% CI 6.3-11.6.

Figure 4: Frequency distribution of height for age z-scores (WHO, 2006)

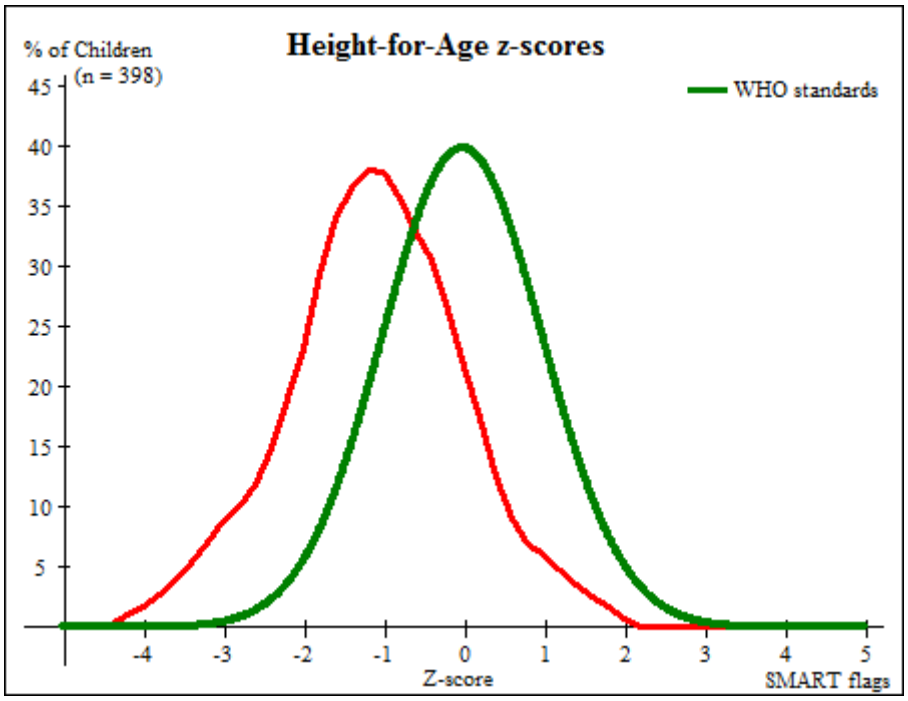


Figure 4 above shows the distribution curve of HAZ of the 398 sampled children shifted to the left of the reference population with a mean HAZ -1.10 (SD=±1.07) below the reference mean (zero), indicating that the population of the sample frame is malnourished compared to the reference population[39]. The standard deviation of the curve (±1.07) lies within the accepted benchmarks (0.8 – 1.2)[40] showing accuracy of the measurements taken.

The skewness (-0.07) and kurtosis (0.02) of the HAZ distribution are within accepted limits (-1 to +1 and <1 respectively), showing a normal symmetrical distribution of the z-scores.

Table 12: Prevalence of stunting by age based on height-for-age z-scores (WHO, 2006)

		Severe stunting (<-3 z-score)		Moderate stunting (>= -3 and <-2 z-score)		Normal (> = -2 z score)	
Age (months)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	98	7	7.1	14	14.3	77	78.6
18-29	98	9	9.2	22	22.4	67	68.4
30-41	74	1	1.4	11	14.9	62	83.8
42-53	91	3	3.3	6	6.6	82	90.1
54-59	37	1	2.7	0	0.0	36	97.3
Total	398	21	5.3	53	13.3	324	81.4

[39] SMART Methodology

[40] M. Golden et al (2006). Measuring Mortality, Nutritional Status and Food security in Crisis Situation: SMART Methodology

4.2.3 Underweight

Table 13: Prevalence of underweight based on weight-for-age z-scores by sex (WHO, 2006)

	All n = 405	**Boys** n = 205	**Girls** n = 200
Prevalence of underweight (<-2 z-score)	(102) 25.2 % (20.3 - 30.8 95% C.I.)	(65) 31.7 % (24.1 - 40.4 95% C.I.)	(37) 18.5 % (13.0 - 25.7 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(86) 21.2 % (16.8 - 26.4 95% C.I.)	(56) 27.3 % (20.6 - 35.2 95% C.I.)	(30) 15.0 % (10.1 - 21.7 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(16) 4.0 % (2.2 - 6.9 95% C.I.)	(9) 4.4 % (1.9 - 9.8 95% C.I.)	(7) 3.5 % (1.7 - 6.9 95% C.I.)

Prevalence of global underweight has not changed significantly (p-value = 0.4845) between this survey and the January 2012 survey, where global underweight was found to be 27.7% (95% CI 23.0-32.9, nor was there a significant difference in severe underweight (p-value = 0.0934, January 2012 7.1%, 95% CI 5.3-9.5).

Figure 5: Frequency distribution of weight for age z-scores (WHO, 2006)

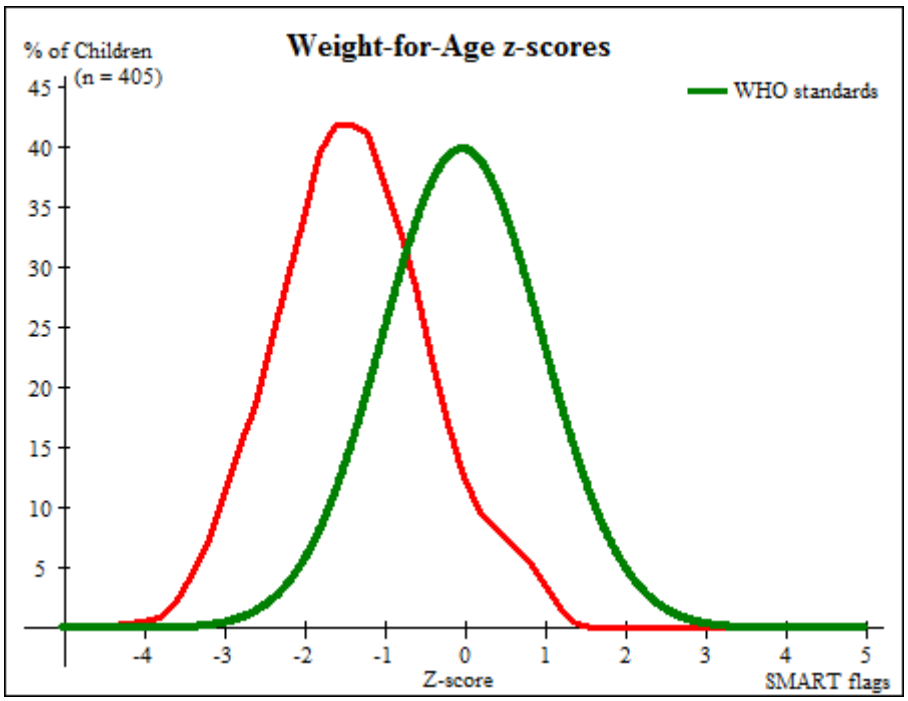


Figure 5 above shows the distribution curve of WAZ of the 405 sampled children shifted to the left of the reference population with a mean WAZ -1.37 (SD=±0.94) below the reference mean (zero), indicating that the population of the sample frame is malnourished compared to the reference population[41]. The standard deviation of the curve (±0.94) lies within accepted benchmarks (0.8 – 1.2)[42], showing accuracy of the measurements taken.

The skewness (0.14) and kurtosis (0.10) of the WAZ distribution are also within accepted limits (-1 to +1 and <1 respectively), showing a normal symmetrical distribution of the z-scores.

[41] SMART Methodology

[42] M. Golden et al (2006). Measuring Mortality, Nutritional Status and Food security in Crisis Situation: SMART Methodology

Table 14: Prevalence of underweight by age based on weight-for-age z-scores and oedema (WHO, 2006)

		Severe underweight (<-3 z-score)		Moderate underweight (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Age (months)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	102	2	2.0	24	23.5	76	74.5	0	0.0
18-29	98	8	8.2	26	26.5	64	65.3	0	0.0
30-41	75	0	0.0	15	20.0	60	80.0	0	0.0
42-53	92	4	4.3	16	17.4	72	78.3	0	0.0
54-59	38	2	5.3	5	13.2	31	81.6	0	0.0
Total	405	16	4.0	86	21.2	303	74.8	0	0.0

4.3 Mortality results

Retrospective mortality rates were estimated using a recall period of 90 days. As there was no significant event around this 90 day mark the survey team agreed to say since beginning of the second week of November in the local language (*Dinka*) which is called *"pen thiar kutok".*

Table 15: Mortality rates

	CMR: Total deaths/10,000 people/day	**U5MR: Deaths 0-5 years/10,000 children 0-5 years/day**
Abyei MICS Feb 2015 (95% CI)	0.60 (0.35-1.04)	1.22 (0.51-2.85)
Abyei MICS Jan 2012 (95% CI)	0.41 (0.20-0.82)	1.02 (0.47-2.20)
Abyei MICS Dec 2010 (95% CI)	0.41 (0.18-0.92)	0.99 (0.34-2.82)
Sphere Emergency Threshold	0.8	2.1
Average baseline for Sub Saharan Africa	0.41	1.07

When comparing the CMR and the U5MR to the results of the January 2012 MICS (CMR 0.41 and U5MR 1.02), no significant difference is shown between either results (p-value = 0.20327 and p-value = 0.42465 respectively).

The table below identifies the causes of death, as reported by the survey respondent. It is important to note that these causes specified below are indicative only and have not been verified by medical records or a medical professional. There were a total of 15 deaths; five were children under five years, and ten were over five years old.

Table 16: Causes of death

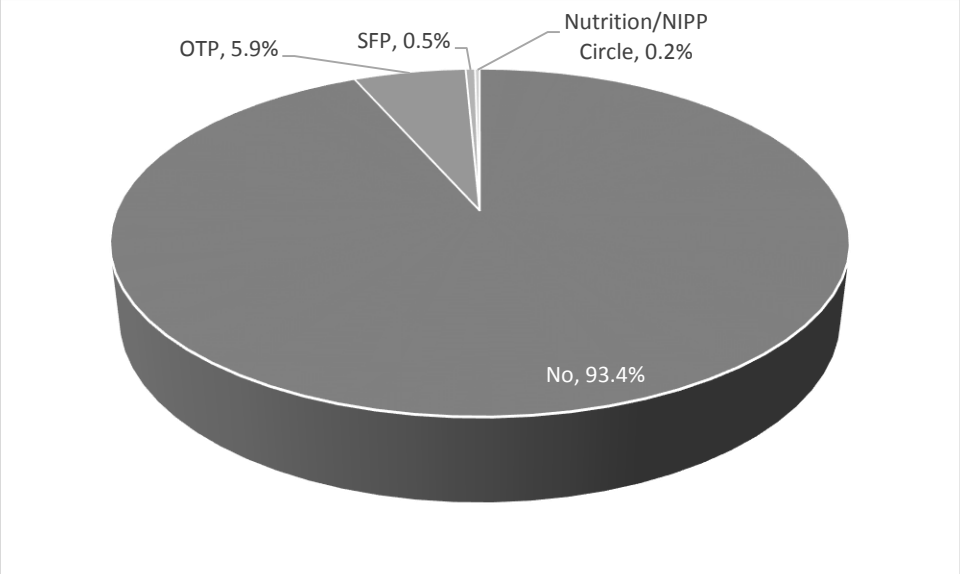
Deaths >5 years		**Deaths < 5 years**	
Cause	**n**	**Cause**	**n**
ARI/pneumonia/cough	2	Diarrhoea	2
Old Age	2	ARI/pneumonia/cough	1
Fever/Malaria	2	Neonatal Mortality	1
Swelling on leg	1	Unknown	1
Maternal Mortality	1		
Violence	1		
Unknown	1		
Total	**10**		**5**

Table 17: Detail for mortality calculations (370 households interviewed; recall period of 90 days)

HH information: TOTAL		HH information: 0-5 years	
Total number HH residents	2729	number 0-5 years	448
Total number people joined HH in recall period	278	number 0-5 years joined HH during recall period	27
Total number people left HH in recall period	349	number 0-5 years left HH during recall period	66
Total number births during recall period	26		
Total number deaths during recall period	15	number 0-5 years deaths during recall period	5
Design effect	1.10	Design effect	1.0

4.4 Nutrition Programme Coverage

Figure 6: Children (6-59 months) who are currently, or have done in the last six months, attending a feeding programme (N=409)



4.5 Children's morbidity

Table 18: Prevalence of reported illness in children in the two weeks prior to survey 0-59 months (N=199)

Prevalence of reported illness	**49.3%** (n=98) (95% CI 42.38-56.14)

Since 2006 the rates of morbidity amongst the children less than five years old has not varied much with the lowest proportion recorded in 2007 at 36.0% and the highest recorded this year at 49.3%. This averages over the eight years as around 44.2%. When comparing this surveys result to that of the 2012 survey results (36.9%) the results show a significant increase from 2012 (p-value = 0.00104). Malaria and/or fever over the years has been the most predominant illness and the proportion of children reported as having diarrhoea is decreasing over the years with a significant decrease since 2012 (13.7% in 2012; p-value = 0.01743).

Table 19: Symptom breakdown two weeks prior to survey

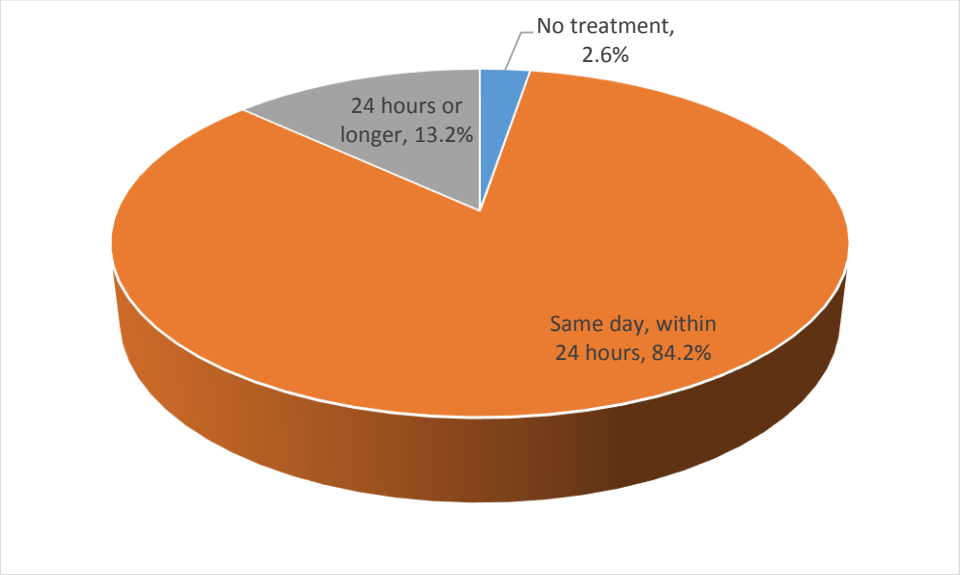
Illness	n	Proportion of children (N=199)	Proportion from illness (N=98)
Malaria/fever	42	21.1	42.9
Cough/difficulty breathing	28	14.1	28.6
Diarrhoea	16	8.0	16.3
Skin infection	9	4.5	9.2
Eye infection	3	1.5	3.1

Table 20: Treatment sought for illness (any) in the past two weeks (N=98)

Treatment Sought	n	%
None	11	11.2
Hospital	18	18.4
PHCC/PHCU	67	68.4
Pharmacy	2	2.0
Total	**98**	**100%**

Among all children who were reported to have had fever in the preceding two weeks (N=42), 90.5% (n=38; 95% CI 77.93-96.23) were brought to a health facility for treatment (hospital or PHCC/PHCU). This health seeking behaviour is one that has shown a steady increase since the 2009 survey where 60.6% sought treatment for fever. Since the 2012 survey which showed a result of 78.7% seeking treatment there has again been an increase but not a significant one (p-value = 0.05705). Those carers who took their child to a health facility within 24 hours of the onset of fever has also shown a significant increase since 2012 (43.5%; p-value = 0.00012).

Figure 7: Timing of treatment sought for children with fever (N=38)



4.6 Vaccination Results

The table below presents the vaccination and vitamin A supplementation coverage by card and caretakers recall.

Table 21: Vaccination and vitamin A coverage by card and care-takers recall for children 6-59 months

Children 6-59 months (N=191)			
Antigen	**n**	**%**	**95% CI**
Measles, verified with card	43	22.5	17.17-28.94
Measles, recall	73	38.2	31.63-45.28
Measles, TOTAL	**116**	**60.7**	**53.66-67.38**
Penta3, verified with card	54	28.3	22.36-35.04
Penta3, recall	76	39.8	33.12-46.87
Penta3, TOTAL	**130**	**68.1**	**61.15-74.26**
Vitamin A, card and recall	97	50.8%	43.75-57.79

Table 22: Vaccination and vitamin A coverage by card and care-takers recall for children 12-23 months

Children 12-23 months (N=74)			
Antigen	**n**	**%**	**95% CI**
Measles, verified with card	27	36.5	26.44-47.87
Measles, recall	23	31.1	21.69-42.34
Measles, TOTAL	**50**	**67.6**	**56.27-77.14**
Penta3, verified with card	31	41.9	31.32-53.26
Penta3, recall	24	32.4	22.86-43.73
Penta3, TOTAL	**55**	**74.3**	**63.35-82.90**
Vitamin A, card and recall	42	56.8	45.41-67.43

Table 23: Measles vaccination coverage for children 9 months and over

Children 9-59 months (N=175)			
Antigen	**n**	**%**	**95% CI**
Measles, verified with card	42	24.0	18.27-30.84
Measles, recall	73	41.7	34.66-49.12
Measles, TOTAL	**115**	**65.7**	**58.41-72.34**
Children 9-23 months (N=94)			
Antigen	**n**	**%**	**95% CI**
Measles, verified with card	31	33.0	24.31-42.99
Measles, recall	32	34.0	25.26-44.08
Measles, TOTAL	**63**	**67.0**	**57.01-75.69**

The rates of all vaccinations and vitamin A supplementation had shown a steady increase until 2012 but since 2012 there has been a decline in coverage and coverage for all vaccinations in now below the herd immunity level of above 80%.

4.7 Infant and young child feeding practices

Information regarding child feeding practices was collected for all children aged 0 – 23 months but analysed as described below. The sample sizes obtained in this type of survey for IYCF practices are small and the results should therefore only be interpreted as a guide and not taken as representative of the population's

knowledge and practices. Due to this reason no comparisons have been made against previous survey results.

Table 24: Initiation of breast feeding, children 0-23 (N=116)

	n	%	95% CI
Immediately (within one hour of birth)	90	77.6	69.18-84.22
From 1 - 24 hours	22	19.0	12.87-27.05
From 25 - 48	2	1.7	0.47-6.07
After 48 hours	2	1.7	0.47-6.07
Total	**116**	**100%**	**-**

100% of the children aged 0-23 months had been breastfed at some point in their life.

Table 25: Breastfeeding practices and introduction of complementary feeding

Indicator	Age group in months	Number in age-group	n	%	95% CI
Children ever breastfed	0 - 23	116	116	100	-
Initiation of breast feeding in first hour	0 - 23	116	90	77.6	69.18-84.22
Exclusive breast feeding[43]	<6 months	5	0	0.0	-
Eating complementary foods	6-8	12	11	91.7	64.61-98.51
Continued breastfeeding at 1 year	12-15	26	20	76.9	57.95-88.97
Continued breastfeeding at 2 years	20 - 23	19	6	31.6	15.36-53.99
Continued breastfeeding (combined)	12-23	75	44	58.7	47.37-69.12

Table 26: Fluids taken by children the day before the survey by age group:

Type of drink (multiple response)	**0-5 months (N=5)**		**6-23 months (N=111)**	
	n	**%**	**n**	**%**
Nothing at all	1	20	-	-
Vitamin drops or medicine as drops	-	-	2	1.8
ORS	-	-	-	-
Plain water	1	20	87	78.4
Infant formula	-	-	8	7.2
Milk (tinned, powdered or fresh)	1	20	72	64.9
Juice or juice drinks	-	-	19	17.1
Clear broth	-	-	15	13.5
Other water based liquids	-	-	5	4.5
Sour milk or yoghurt	-	-	-	-
Thin porridge	-	-	50	45.0
Breast milk	4	80	71	64.0
Other (not specified)	-	-	1	0.9

[43] Defined as giving a child breast milk and no other liquids or solids the day before the survey

Table 27: Food eaten by children day before the survey by age group

Type of food (multiple response)	**0-5 months (N=5)**		**6-23 months (N=111)**	
	n	**%**	**n**	**%**
Nothing	1	20	2	1.8
Cereals	1	20	95	85.6
Legumes/nuts	1	20	28	25.2
Roots/tubers	-	-	1	0.9
Meat/poultry/offal	-	-	9	8.1
Fish/sea food	-	-	32	28.8
Milk/ milk products	3	60	62	55.9
Vegetables	-	-	13	11.7
Fruits	-	-	2	1.8
Eggs	-	-	6	5.4
Oil/fat	-	-	13	11.7
Sugar/ honey	-	-	20	18.0

Table 28: Foods eaten by children the day before the survey by age group (GOAL food groups)

Food groups (multiple response)	**0-5 months (N=5)**		**6-23 months (N=111)**	
	n	**%**	**n**	**%**
Nothing	1	20	2	1.8
Grains, roots and tubers	1	20	96	86.5
Legumes and nuts	1	20	28	25.2
Dairy products	3	60	62	55.9
Flesh foods	-	-	41	36.9
Eggs	-	-	6	5.4
Fruits and vegetables	-	-	15	13.5

NB: This survey did not separate vitamin-A rich fruits and vegetables from 'other' fruits and vegetables.

WHO defines minimum dietary diversity as eating from at least four food groups per day, in the survey area only 0.5% of children age 6-23 months were fed from four or more food groups.

Table 29: Dietary diversity, children 6-23 months, the 24 hours before the survey

Number of food groups eaten	**n**	**%**	**95% CI**
One group	15	13.5	8.36-21.10
Two groups	54	48.7	39.55-57.84
Three groups	37	33.3	25.25-42.53
Four or more groups	3	2.7	0.92-7.65
Ate nothing	2	1.8	0.50-6.33
Total	**111**	**100**	**-**

Table 30: Number of meals taken, the 24 hours before the survey, children aged 6-23 months (N=109)

No. of meals	Children currently breastfed				Children currently not breastfed	
	6-8 months (N=11, 1 missing)		9-23 months (N=83, 1 missing)		6-23 months (N=15)	
	n	%	n	%	n	%
None	1	9.1	4	4.8	-	-
1	2	18.2	-	-	-	-
2	2	18.2	22	26.5	2	13.3
3	2	18.2	33	39.8	12	80.0
4 or more	4	36.3	24	28.9	1	6.7

WHO considers minimum meal frequency as:

- two or more meals per day for breastfed children age 6-8.9 months
- three or more meals per day for breastfed children age 9-23.9 months
- four or more meals per day for non-breastfed children[44].

Using this classification, 60.6% of children (N=109, n=66; 95% CI 51.17-69.22) are eating frequently enough.

Minimum acceptable diet is defined for children from 6-23 months (N=109) as meeting minimum meal frequency and minimum meal diversity. This is achieved for 1.8% of children (n=2, 95% CI 0.50-6.44).

Table 31: Feeding practices during illness, children 6-23 months

Practice	Liquid		Food	
	n	%	n	%
Nothing to drink/eat	6	5.5	4	3.7
Much less than normal	24	22.0	29	26.6
Somewhat less	35	32.1	26	23.9
About the same	32	29.4	36	33.0
More than usual	12	11.0	14	12.8
Total	**109**	**100%**	**109**	**100%**

Respondents we asked about feeding practices (liquid and food) during episodes of illness for children from age 6-23 months. The question was to be answered in relation to what was given to the child during the last episode of illness. During an episode of illness, children should be given more fluids and continued feeding (the same or more food than usual); only 7.3% (n=8; 95% CI: 3.77-13.82) of caregivers reported that they did both of these positive practices.

4.8 Household demography

Based on the findings of the households included in the survey with children under five years of age the following describes the household demography of the general population.

A total of 213 households were sampled for the household questionnaire. There were a total of 1,830 people living in these households, at an average household size of 9 persons. Of these, 414 were less than five years, giving an average of 1.9 children less than five years per household.

[44] Indicators For Assessing Infant And Young Child Feeding Practices. Conclusions of a consensus meeting held 6-8 November 2007 in Washington D.C., USA. http://www.fantaproject.org/publications/iycf_definitions2008.shtml

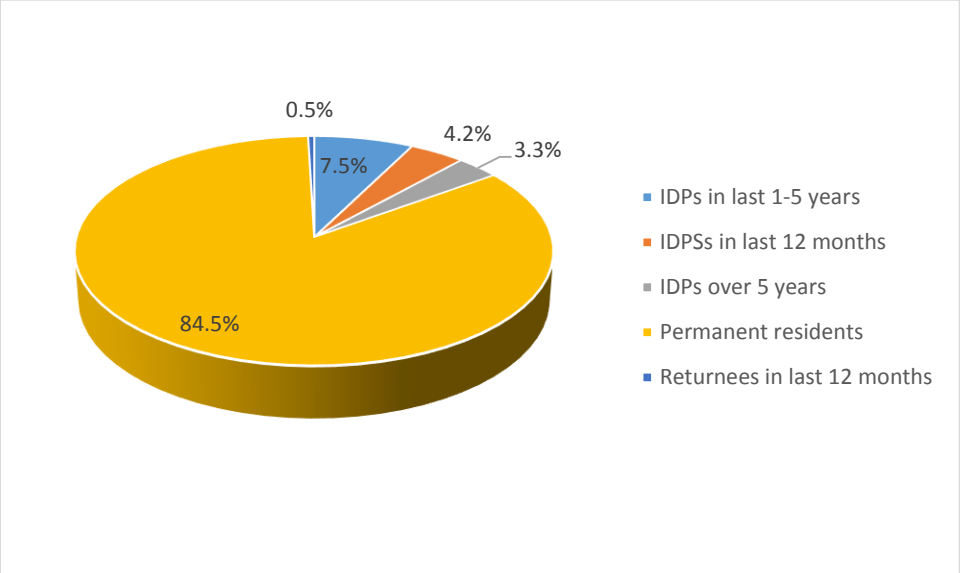
Table 32: Household demographics taken from the household questionnaire findings (N=213):

Category	n	%
Females	946	51.7%
Males	884	48.3%
Total Population in HHs	**1830**	**100%**
Females, under 5 years	203	49.0%
Males, under 5 years	211	51.0%
Total under 5 years in population	**414**	**22.6%**
Pregnant women in HHs	**38**	**4.0% (of females)**
Female Headed Households	**57**	**26.8%**
Female respondents	**196**	**92.0%**

4.9 Household questionnaire

4.9.1 Resident status

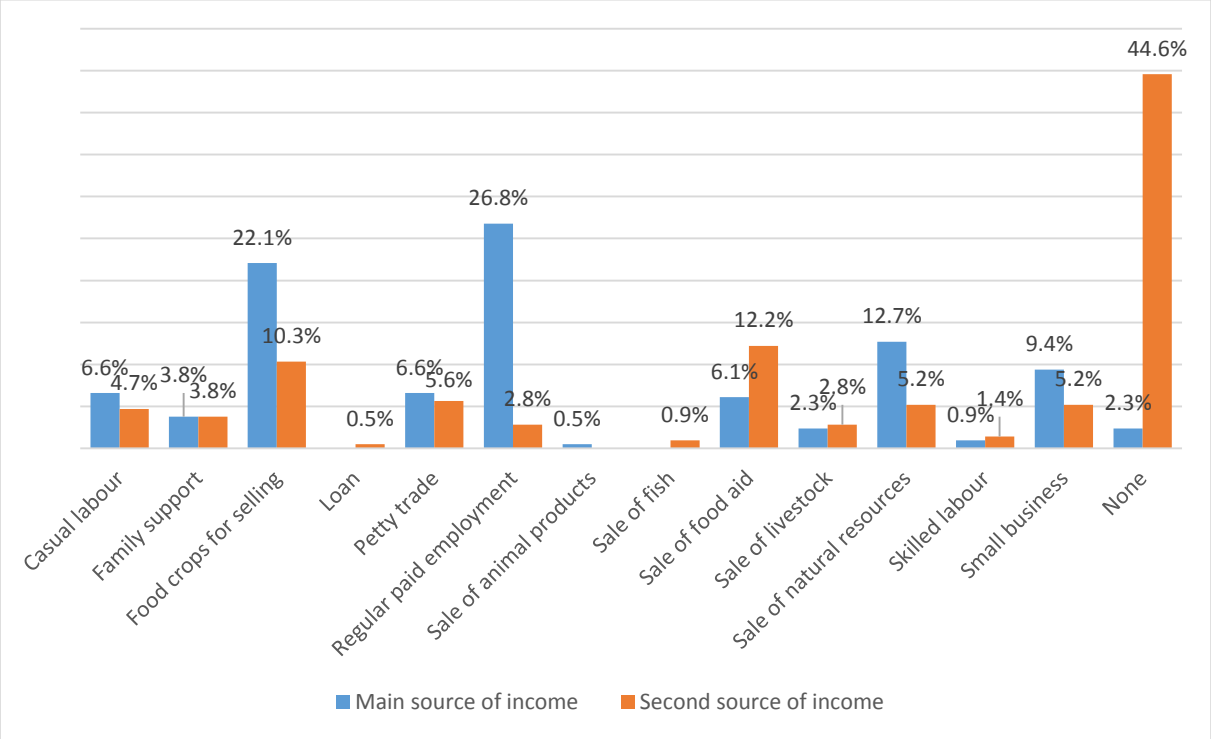
Figure 8: Resident status of the households in the sample population (N=213)



4.9.2 Livelihoods

Resources and Expenses

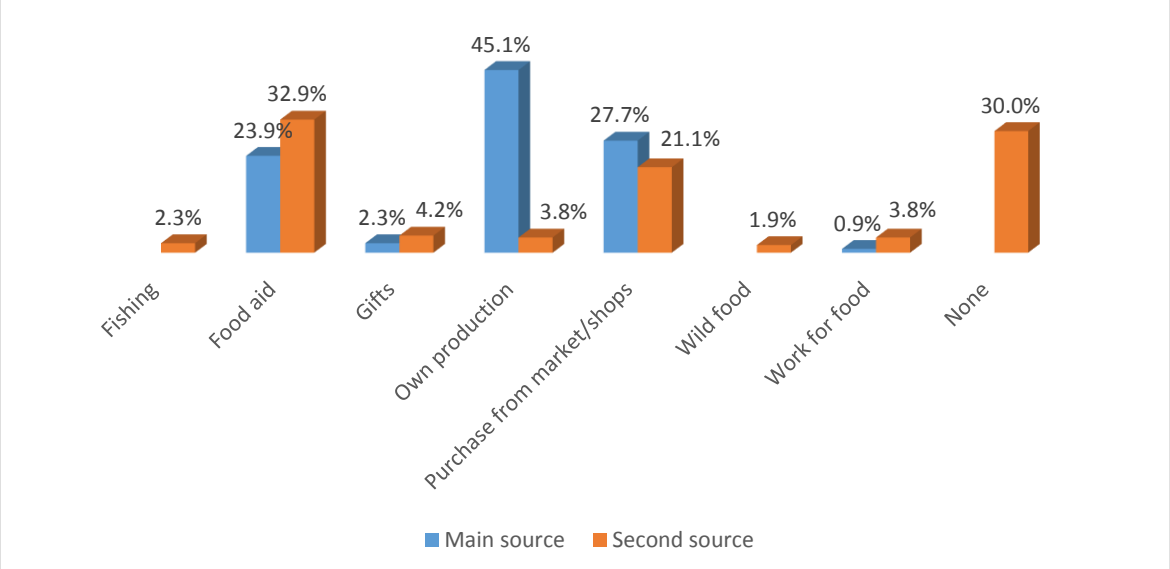
Figure 9: Source of cash income (N=213)



Of the total households (N=213), 2.4% (n=5, 95% CI 1.01-5.38) reported having no sources of income, 42.3% (n=90, 95% CI 35.81-48.97) had one source of income and 55.4% (n=118, 95% CI 48.69-61.92) of households mentioned two sources of income but only 8.0% mentioned two sources of income and an increase in income in the last 12 months (n=17, 95% CI 5.04-12.41).

The trend for the proportion of households with two sources of income has increased over the years and when compared to the 2012 survey results (29.2%) there has been a significant increase to this year (p-value = 0).

Figure 10: The households' current main food sources (N=213)



Of the total households, 70.0% (n= 149, 95% CI 63.49-75.71) reported two sources of food and 30.1% (n=64, 95% CI 24.29-36.51) reported one source of food. The trend for the proportion of households with two sources of food has increased over the years and when compared to the 2012 survey results (51.9%) there has been a significant increase to this year (p-value = 0).

Figure 11: Food groups in stock on the day of the survey (N= 213)

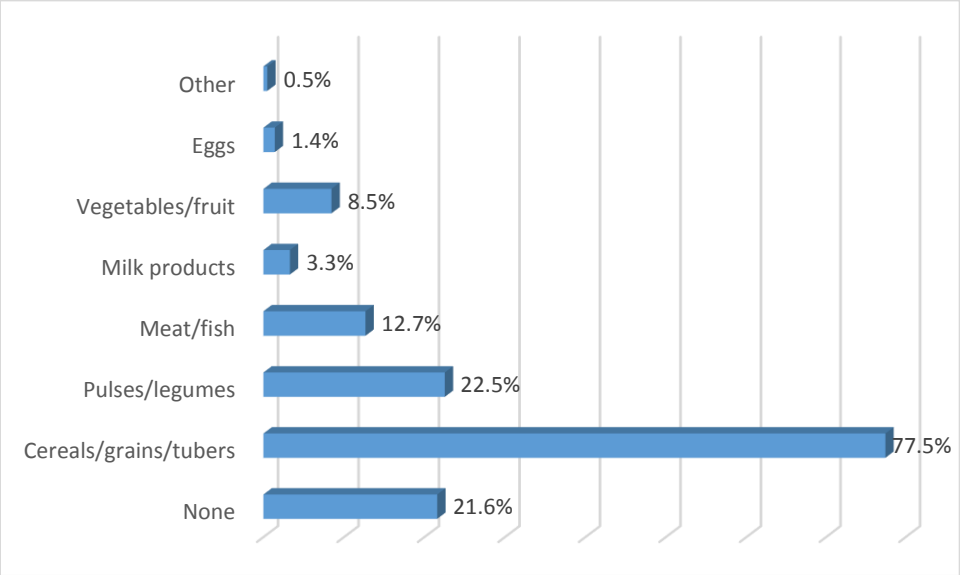


Table 33: Number of food group in stock in households on day of survey

Food groups	n	%	95% CI
None	46	21.6	16.60-27.60
One group	89	41.7	35.36-48.50
Two groups	57	26.8	21.27-33.08
Three groups	18	8.5	5.41-12.96
Four groups	3	1.4	0.48-4.06
Total	**213**	**100%**	-

9.9% (n=21, 95% CI 6.54-14.60) household reported that they had at least three food groups in stock in the home on the day of survey. This is a significant increase from the 2012 survey result (1.4%; p-value = 0.00016).

Cultivation

Of the 213 households who responded to this question 77.6% (n=161, 95% CI 69.40-80.87) reported that they cultivated in the current/most recent growing season. Crops that were cultivated consisted of those shown in the Figure below.

Figure 12: Types of crops cultivated by the household (N=213)

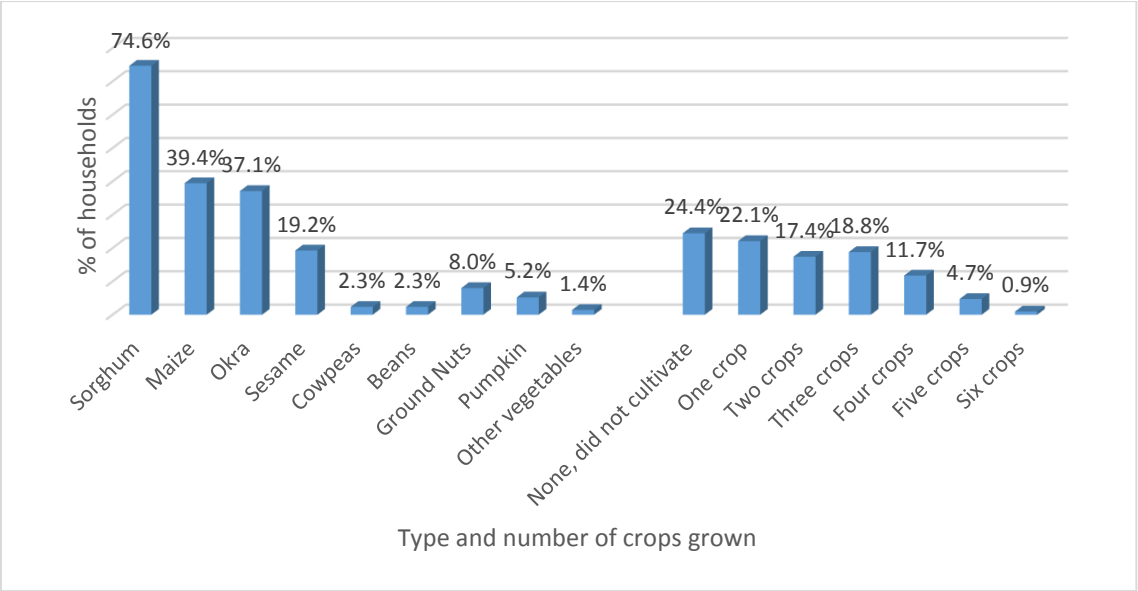


Figure 13: The respondents' comparison to last season's harvest of those who cultivated this year (N=161)

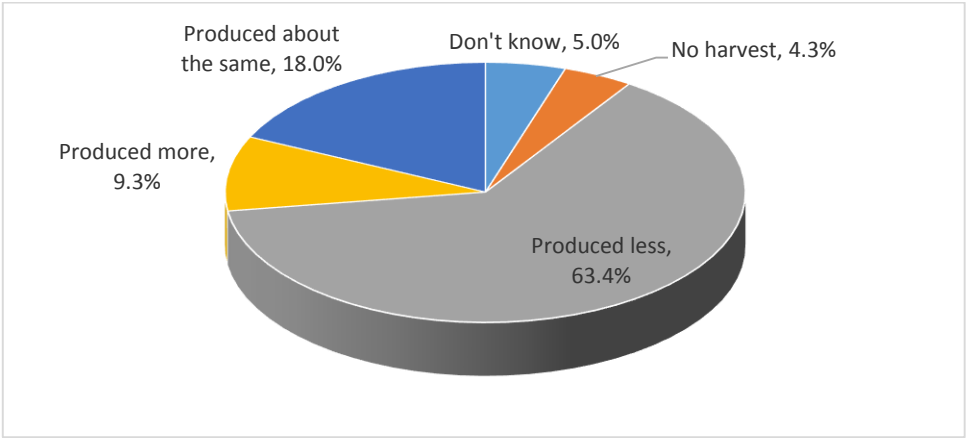
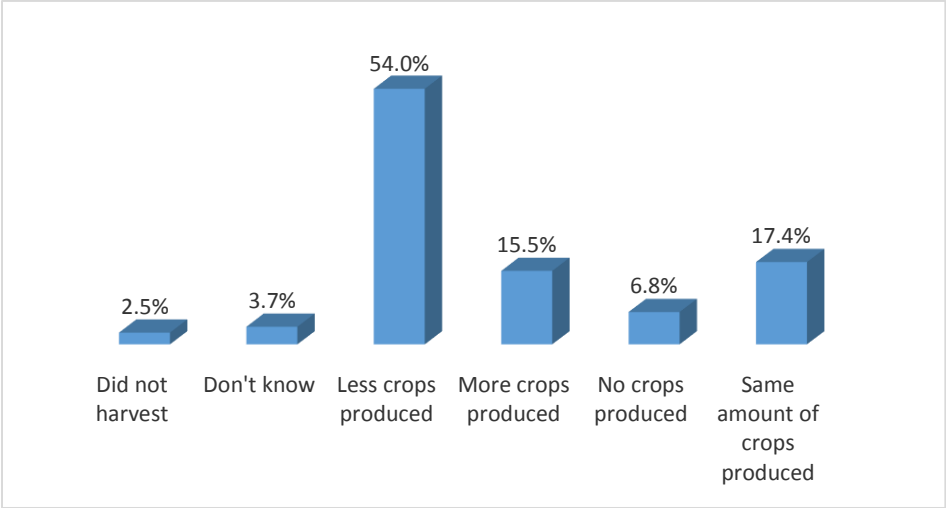
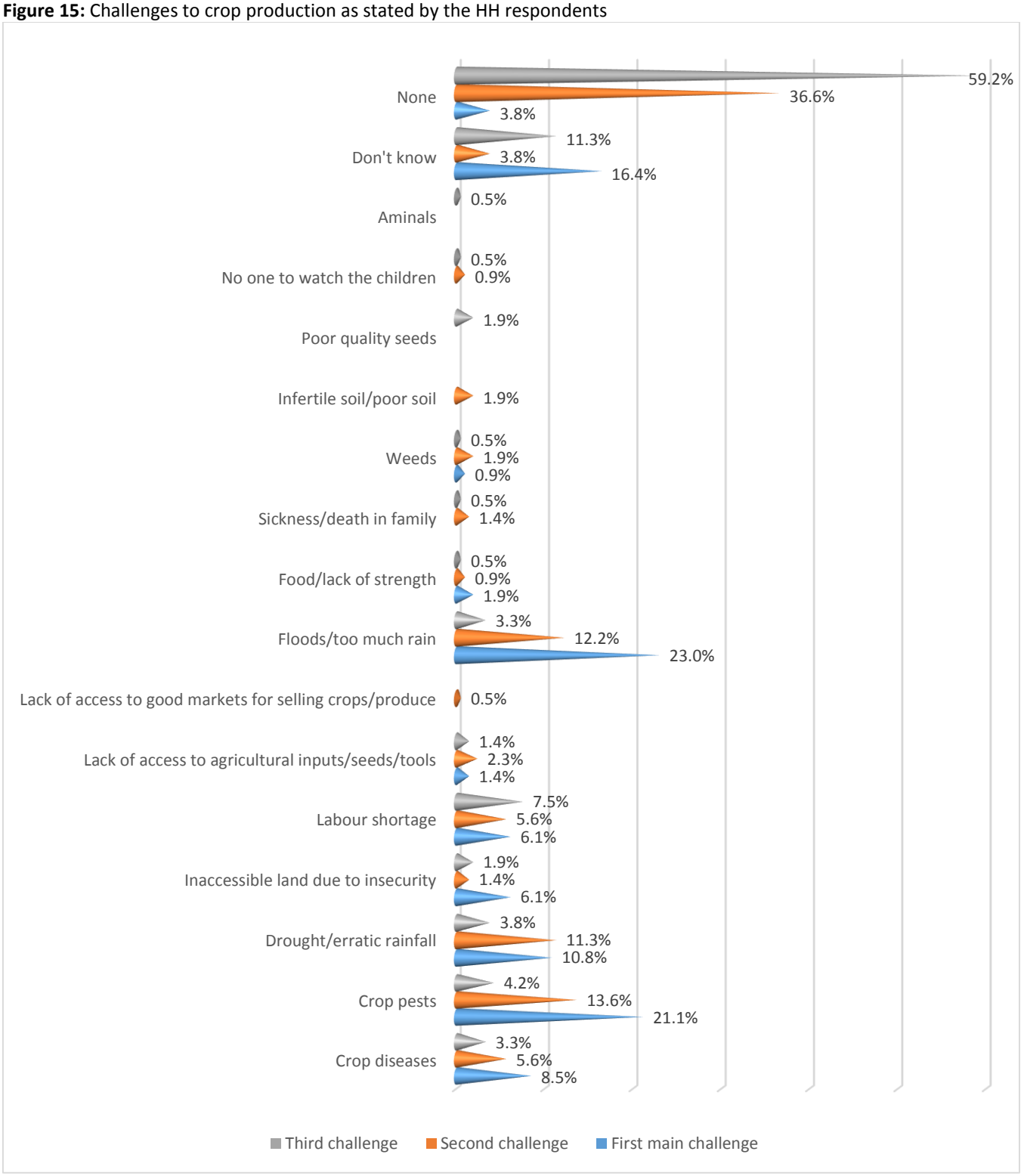


Figure 14: Crops produced for household consumption compared to previous harvest (N=161)



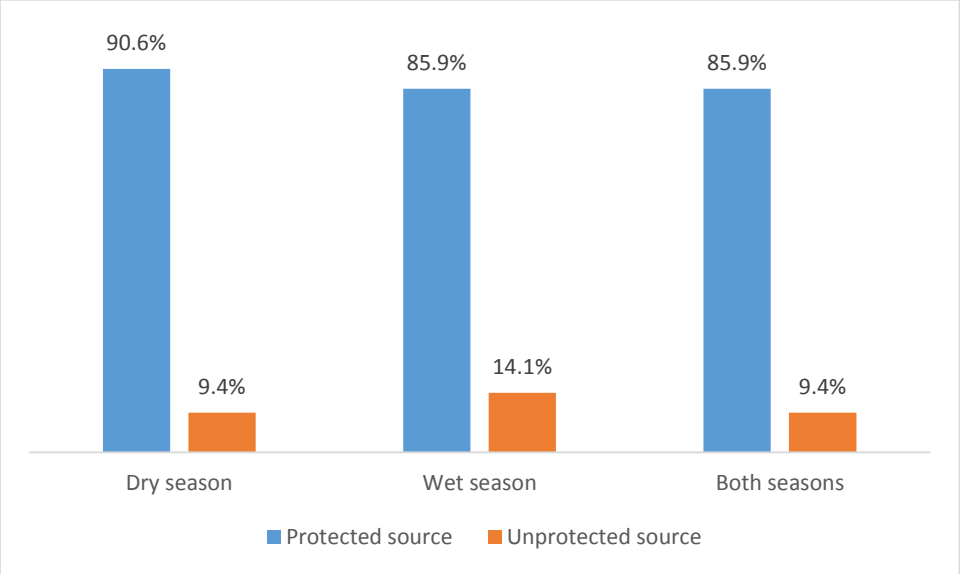
Respondents were asked what the three main challenges were that they faced whilst cultivating. Their responses are shown in the Figure below.

Figure 15: Challenges to crop production as stated by the HH respondents



4.10 Water, sanitation and hygiene

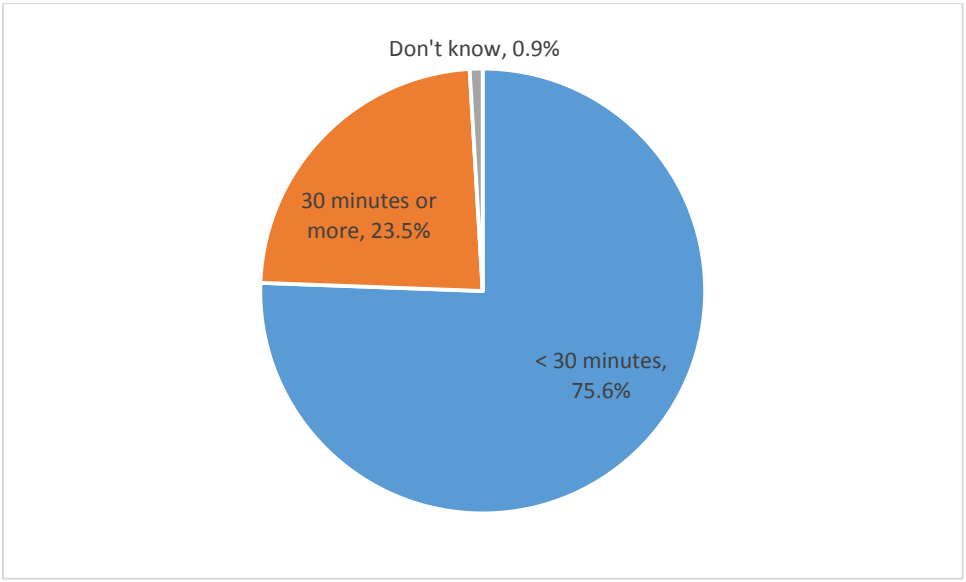
Figure 16: Proportion of households sourcing water from a protected or unprotected water source for the dry and wet seasons (N=213)



Since 2006 there has not been much change over the years in relation to the proportion of households using water from a protected water source in the dry and wet seasons. Over the last eight years on average 85.1% of households access a protected water source during the dry season and 86.2% in the wet season.

75.6% of households (n=161, 95% CI 69.40-80.87) are able to walk to their nearest improved water source in less than 30 minutes. When this result is compared to the 2012 survey result, 47.3%, a significant increase is seen (p-value = 0).

Figure 17: Time taken by households to walk to the nearest improved water source (N=213)



The average amount of water used per household was 82.4 litres (±65.8SD) on the day prior to the survey. The average number of litres used per person per day was 9.6. The average daily water consumption has shown a steady increase over the years since 2009; however this year the average has fallen from 12.3 litres/person/day in 2012 to 9.6 litres this year.

Table 34: Household water use (N=213)

Category of litres used	n	%	95% CI
<=10 litres/person/day	145	68.1	61.54-73.97
10.1-15 litres/person/day	46	21.6	16.60-27.60
15.1-20 litres/person/day	17	8.0	5.04-12.41
>20 litres/person/day	5	2.4	1.01-5.38
Total	**213**	**100**	

Only 1.4% of households (n=3, 95% CI 0.48-4.06) reported that they use an appropriate water treatment method to treat their water before drinking it. A breakdown of the responses follows:

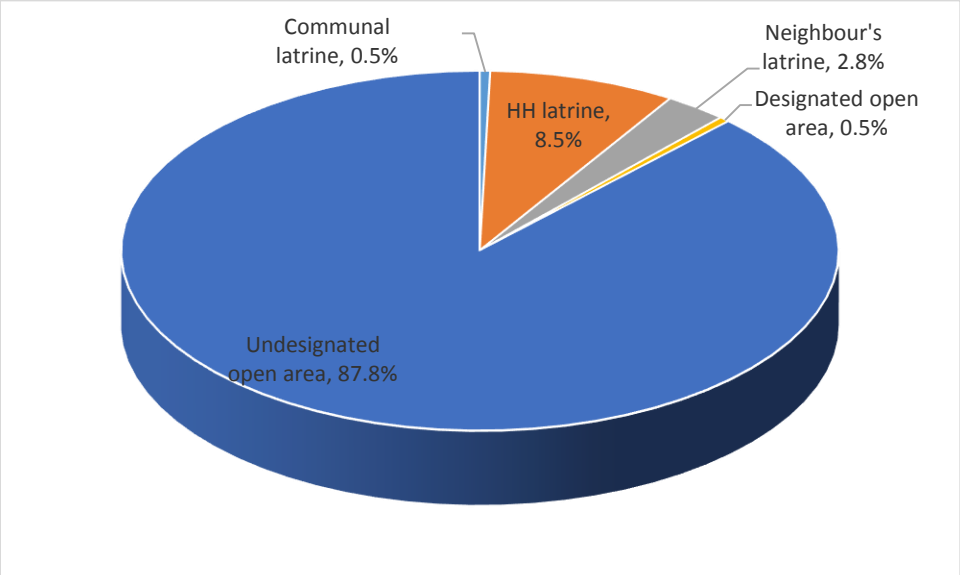
Table 35: Drinking water treatment methods used as reported by the survey respondents

Type of treatment	n	%	95% CI
No treatment	205	96.2	92.77-98.08
Boiling	2	0.9	0.26-3.36
Filtering with a cloth	3	1.4	0.48-4.06
Chlorination	1	0.5	0.08-2.61
Other (use a strainer, store in another water container)	2	0.9	0.26-3.36
Total	**213**	**100**	

Altogether, 92.0% of respondents are collecting water from a protected water source (in the dry season) or treating water with an appropriate method (boiling, or chlorination) from an unprotected water source before drinking it (n=196; 95% CI 87.59-94.96).

Of the households surveyed (N=213), 83.1% (n=177, 95% CI 97.31-99.11) of households reported storing drinking water in containers. Of these, 171 HHs allowed the enumerators to observe the containers and 15.2% (n=26, 95% CI 10.59-21.35) of households were found to be using appropriate drinking water storage, including a clean container, covered (all) with a narrow mouth.

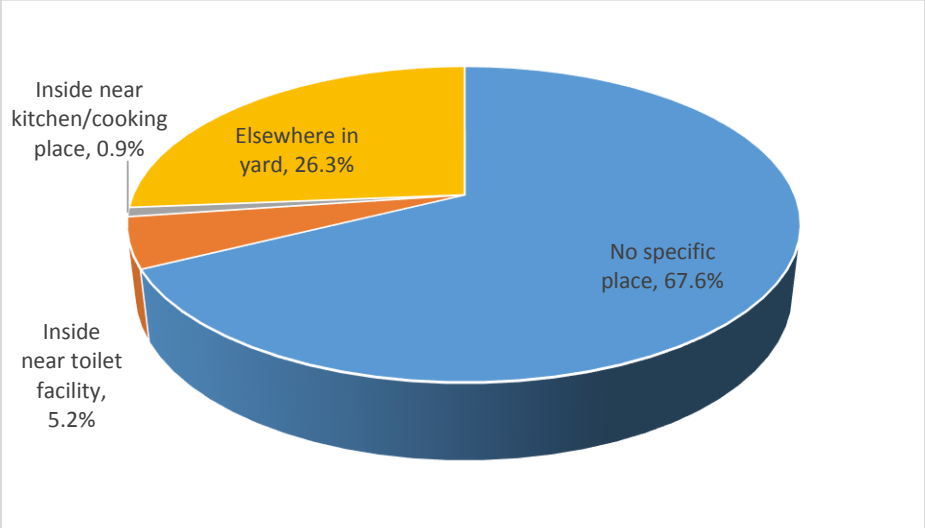
Figure 18: Households place of defecation (N=213)



Overall, 11.7% of households usually defecate in a latrine (household, neighbour's or communal) (n=25, 95% CI 8.08-16.75). When compared to the results of the 2012 survey (17.2%) this year's result does not show a significant fall in latrine usage (p-value = 0.08544).

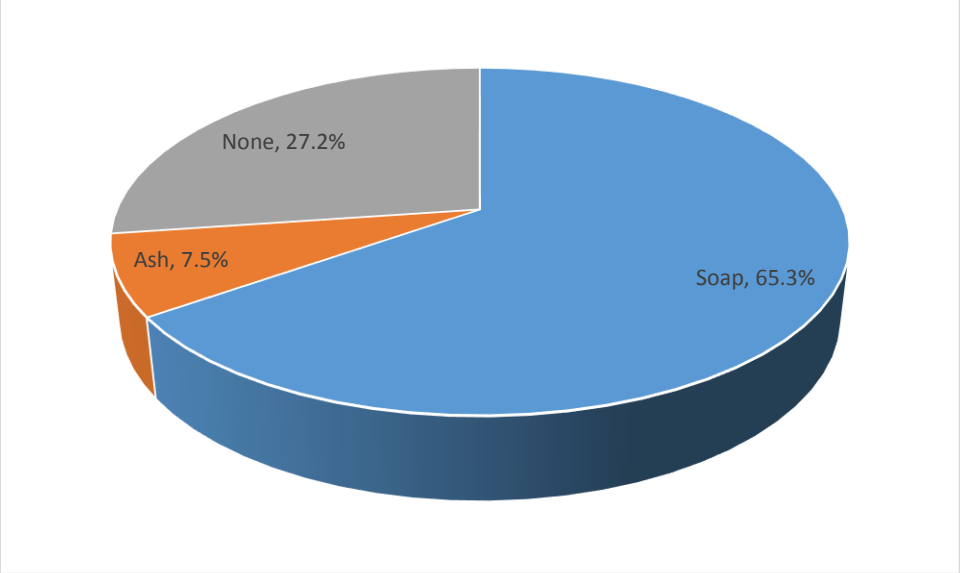
The survey teams asked if they could see the area where the household washed their hands. The figure below outlines the results:

Figure 19: Place of hand washing (N=213)



During the observation of the hand washing place respondents were asked what washing material they used and if they could produce it; 72.8% had material for hand washing available (n=155, 95% CI 66.43-78.31).

Figure 20: Hand washing material available (N=213)



17.4% of households were observed to have a designated area for hand washing with soap or ash available at that location (n=37, 95% CI 12.87-23.02). Compared to the 2012 survey result of 25.8% the result from this survey shows a significant decrease (p-value = 0.0232).

There are five critical times for hand washing, which help reduce the transmission of disease. Respondents were asked to identify when they usually wash their hands. Only 0.9% mentioned all five critical times. Compared to the 2012 survey result of 26.8% the result form this survey shows a significant decrease of knowledge (p-value = 0).

Figure 21: Proportion of respondents who identified critical times for washing hands (N=213)

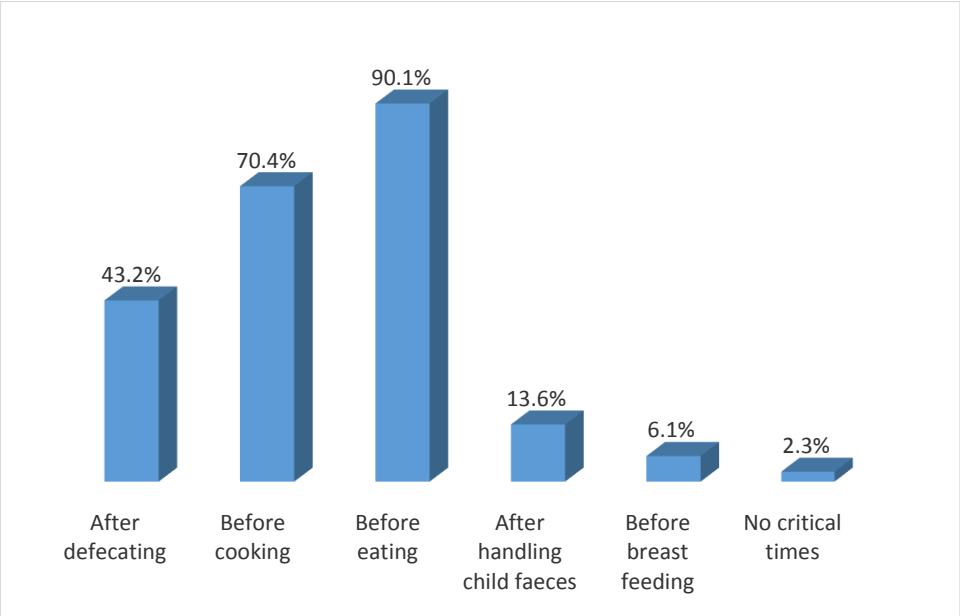


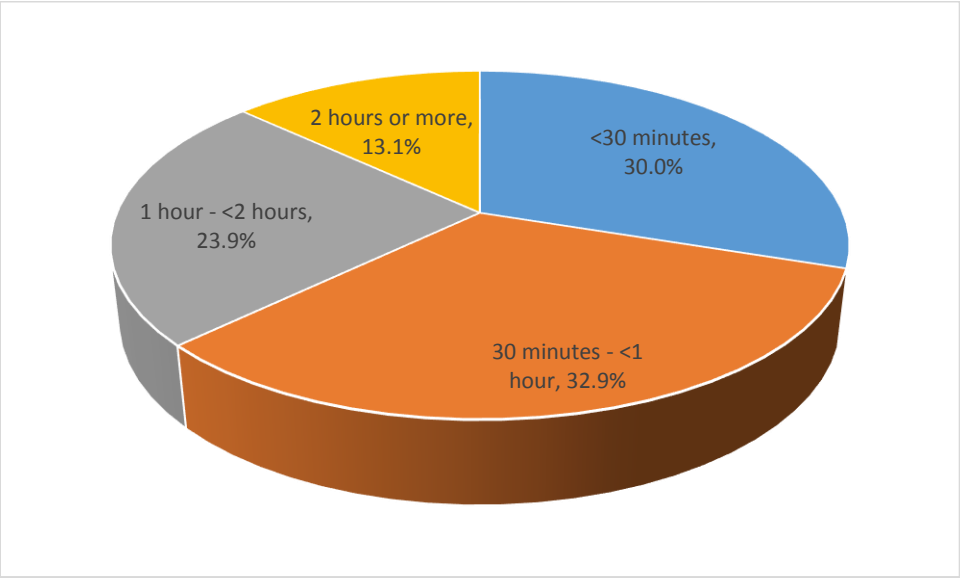
Table 36: Identified critical times for hand washing

Number mentioned	n	%	95% CI
5 critical times	2	0.9	0.26-3.36
4 critical times	16	7.5	4.68-11.85
3 critical times	71	33.3	27.35-39.91
2 critical times	71	33.3	27.35-39.91
1 critical time	48	22.5	17.44-28.60
No critical times	5	2.4	1.01-5.38
Total	**213**	**100%**	

4.11 Health practices and knowledge

Quality and accessibility of health facilities

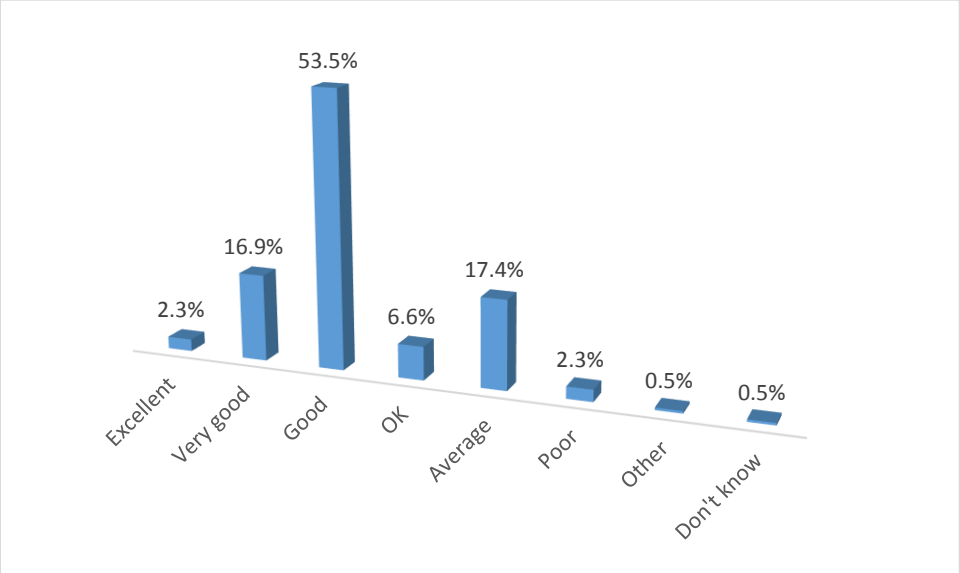
Figure 22: Walking distance to health facility (N=213)



62.9% of households that responded to the questionnaire are within a one hour walk of a health facility (n=134, 95% CI 56.25-69.12).

Of the total respondents (N=213), 58.2% (n=124, 95% CI 51.50-64.64) stated that they thought access to the health facility was easy, whereas 41.8% (n=89, 95% CI 35.36-48.50) stated that access was not easy.

Figure 23: Quality of the service provided by the health facility as reported by the survey respondents



Of the total respondents (N=213), 50.2% (n=107, 95% CI 43.58-56.89) reported that the health facility was within a one hour walk, that the access to the health facility was easy and that the service was acceptable (eg responding with OK, good, average, very good and excellent).

Household Health Status

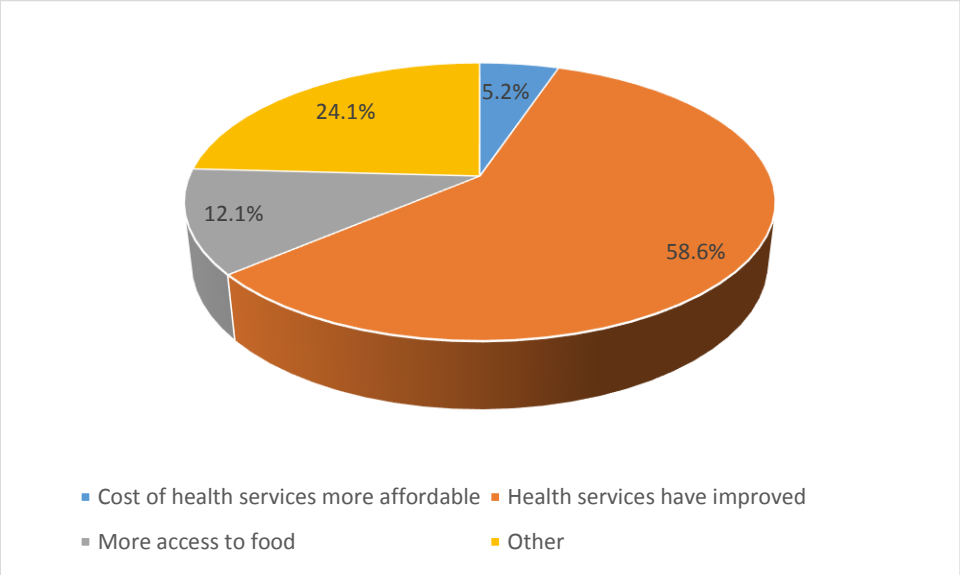
Table 37: Perception about general health status

Health status	n	%	95% CI
The same	71	33.3	27.35-39.91
Improved slightly	41	19.4	14.52-25.07
Improved significantly	17	7.9	5.04-12.41
Deteriorated slightly	71	33.3	27.35-39.91
Deteriorated significantly	13	6.1	3.60-10.16
Total	213	100	

The proportion of households stating that their family's health status has improved is the same as what was reported in the 2012. Those households who reported a deterioration in their family's health status have significantly decreased since the 2012 survey (58.3%; p-value = 0).

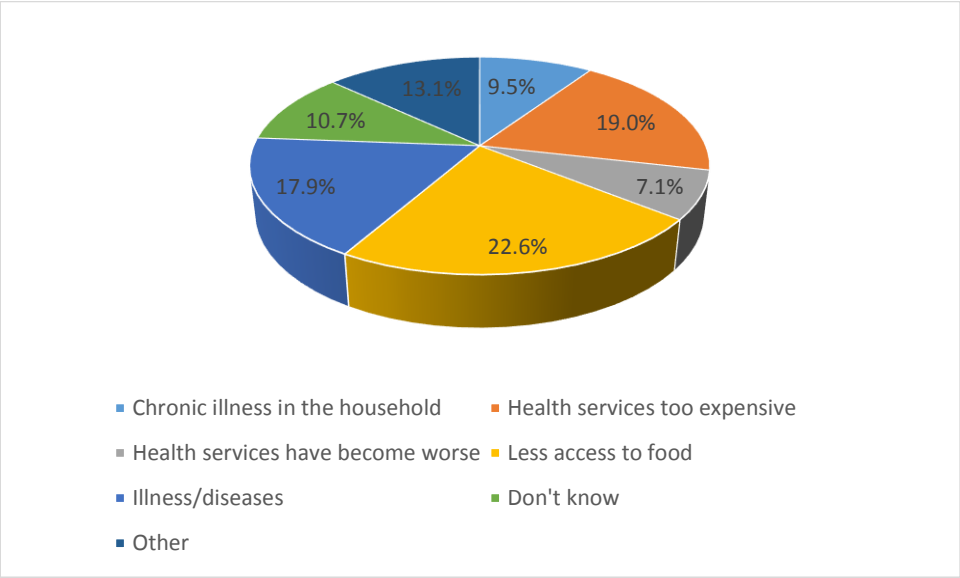
The main reasons cited for the changes in health status is shown in the figures below. Of those who thought there was an improvement in their family's health status compared to last year 58.6% (n=34, 95% CI 45.80-70.37) attributed this to improvement in health services. Those who think that their health deteriorated compared to last year cited that the main reason was as a result of less access to food 22.6%, (n=19, 95% CI 14.99-32.65).

Figure 24: Reasons for improvement of health status (N=58)



'Other' responses included: god, better only in 2015, don't know, dry season, floods stopped, last year had ill person but better now, last year poor quality in food supply, less sickness this year, local bad magic bothered household last year, more blessing this year, no stagnant water and grass, no wars, positive change in environment, taking to hospital.

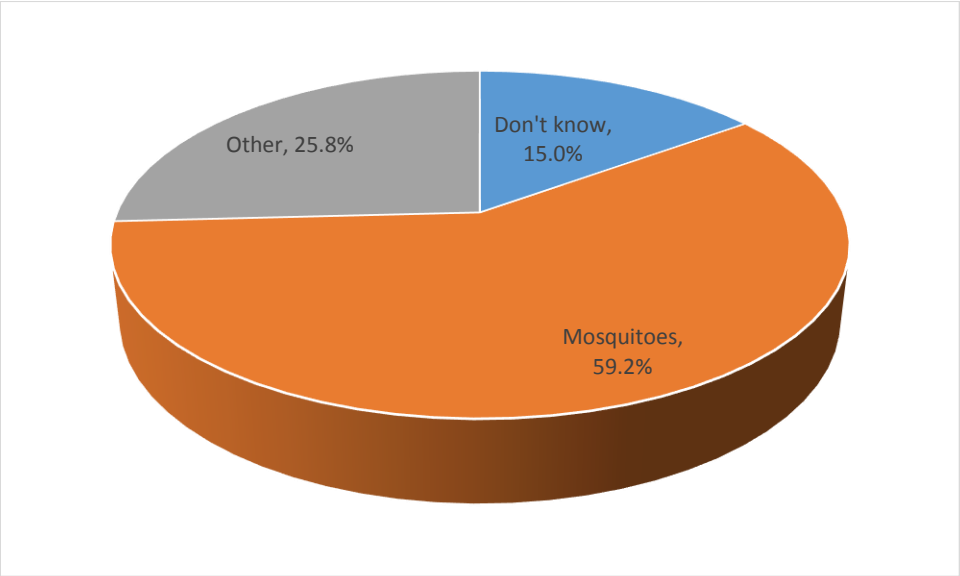
Figure 25: Reasons for deterioration of health status (N=84)



'Others' responses include: death of husband, god arrangements, insecurity, not enough food (2), loss of relative in Khartoum, population increase, too much flooding, too much heat, death in household, up and down movement.

Malaria knowledge

Figure 26: Knowledge of the cause of malaria (N=213)



Other responses include fasting/lack of food (26), too much sun/heat (11), too much oil in food (2), eating bad food (17), flies (2), heavy work (1) and lack of blood (2). Some respondents stated two causes amongst the 'other' responses.

The respondents were asked how they can prevent malaria; 26.8% (n=57, 95% CI stated that they did not know how to prevent malaria, 61.5% (n=131, 95% CI 54.82-67.78) stated at least one correct way of preventing malaria including using an ITN, IRS, removing mosquito breeding sites and covering up at dusk. The remaining 25 respondents gave responses which would not prevent malaria (11.7%, 95% CI 8.08-16.75) mostly focusing around eating well and staying out of the sun.

Mosquito net use

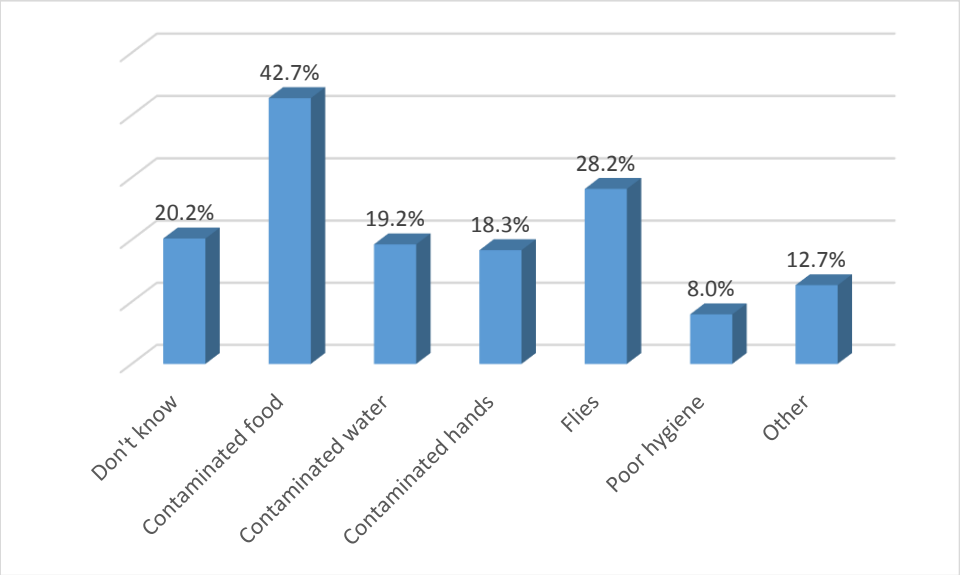
A total of 78.4% (n=167; 95% CI 72.40-83.40) of the households surveyed (N=213) reported owning at least one long lasting insecticide treated mosquito net (LLITN), while 21.6% (n=46, 95% CI 15.16.60-27.60) did not own a net.

The average number of insecticide treated mosquito nets owned per household was 2. Among households that owned LLITNs, the minimum number owned was 1 (46 households) and the maximum number owned was 12 (1 household).

Of the total children <5 years old 66.3% (n=132, 95% CI 59.51-72.53) were reported to have slept under a LLITN the night before the survey. This is the lowest proportion recorded since the 2010 survey but could also reflect the fall in households owning at least one mosquito net which is also at its lowest since 2010.

Diarrhoea knowledge

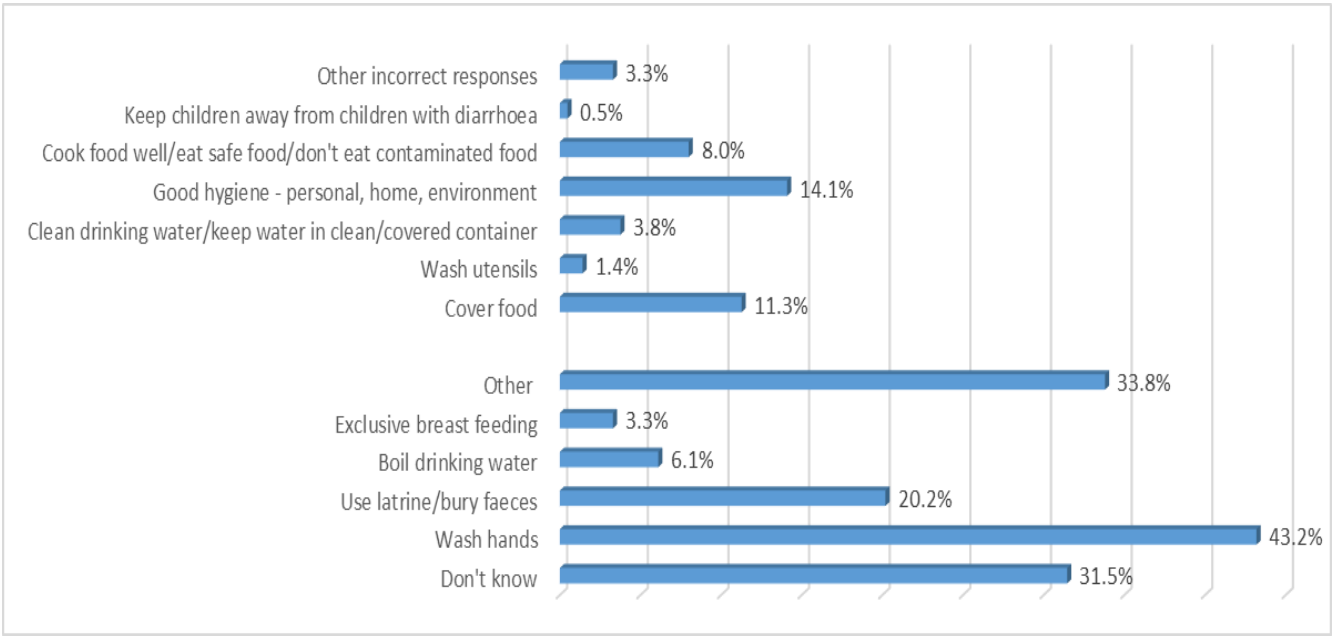
Figure 27: Knowledge of the causes of diarrhoea (N=213)



Other responses include hunger, over eating, bacteria, malaria, under/uncooked food, bad intestines, drinking very hot water, soil, hot climate/heat, eating greens, dirty environment, meeting a child with diarrhoea and human feaces.

Figure 28: Respondents' knowledge of ways to prevent diarrhoea (N=213)

Please note that the top seven columns are the breakdown of the 'other' ways of preventing diarrhoea as reported by the respondents shown in the six columns in the lower half of the chart.



The respondents were asked what they would do if their child had diarrhoea and if their child had a cough with difficult/fast breathing. The responses are outlined in the table below.

Table 38: Respondents action if their child had diarrhoea or ARI

Action taken	Child with diarrhoea			Child with ARI		
	n	%	95% CI	n	%	95% CI
Go to a clinic	168	84.4	78.74-88.80	182	92.9	88.37-95.70
Go to a traditional healer	2	1.0	0.28-3.59	4	2.0	0.80-5.13
Use local herbs at home	2	1.0	0.28-3.59	5	2.6	1.09-5.83
Buy drugs in the market	3	1.5	0.51-4.34	1	0.5	0.09-2.83
Take ORS	24	12.1	8.24-17.32	-	-	-
Nothing	-	-	-	4	2.0	0.80-5.13
Total	199	100%	-	196	100%	-

4.12 Maternal health

Maternal health questions were asked to all respondents with children under the age of five (generally the mother unless she was unavailable). Women were asked to respond in relation to the pregnancy and birth of their youngest child.

Antenatal Care

88.6% of respondents said that they attended at least one ANC visit during their last pregnancy (n=187, 95% CI 83.63-92.24). 86.3% of respondents attended two or more ANC visits (n=182; 95% CI 80.96-90.26). The proportion of women attending at least two ANCs during their pregnancy has risen steadily since 2006 and shows a significant increase compared to the 2012 survey result (74.5%; p-value = 0.00124). Those attending four or more ANCs has also shown a significant increase compared to the 2012 survey result (47.0%; p-value = 0.00466).

Table 39: Number of ANC visits during last pregnancy

	n	%	95% CI
No ANC	24	11.4	7.76-16.37
One visit	5	2.4	1.02-5.43
Two visits	19	9.0	5.84-13.63
Three visits	37	17.5	13.00-23.23
Four or more visits	126	59.7	52.98-66.10
Total	**211**	**100%**	**-**

Table 40: IPT received at ANC during last pregnancy

	n	%	95% CI
No IPT	10	4.7	2.59-8.50
Once (card)	24	11.4	7.76-16.37
Twice or more (card)	25	11.9	8.16-16.91
Once (recall)	71	33.7	27.62-40.27
Twice or more (recall)	33	15.6	11.36-21.15
Don't know	24	11.4	7.76-16.37
No ANC	24	11.4	7.76-16.37
Total	**211**	**100%**	**-**

Figure 29: Proportion of women receiving iron tablets for at least 30 days at ANC

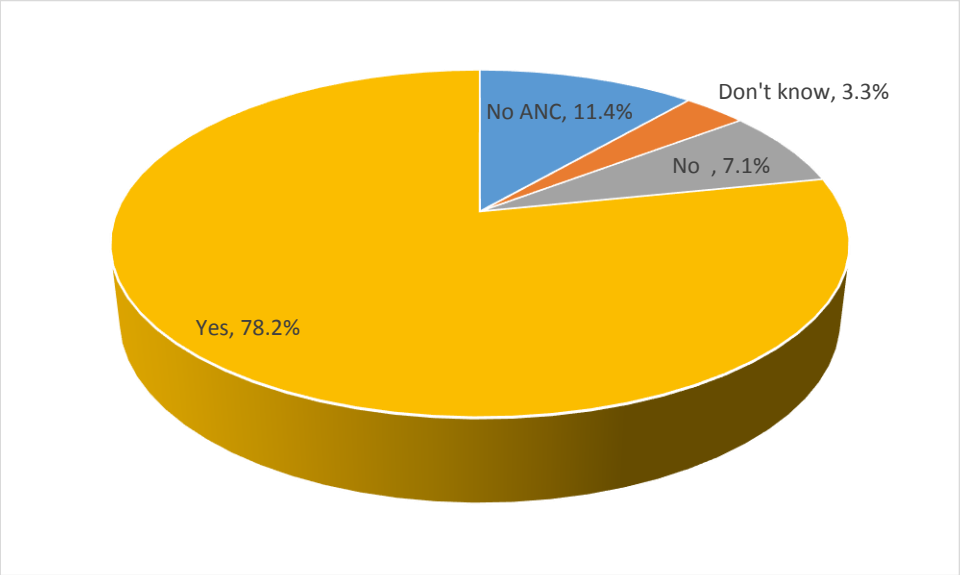
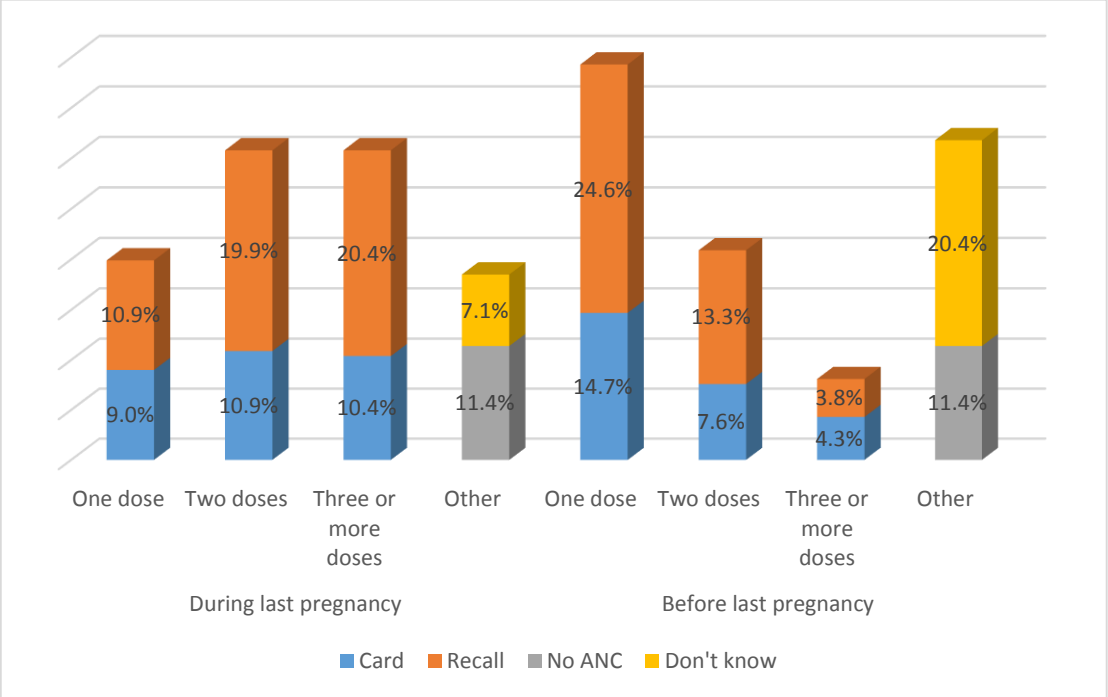
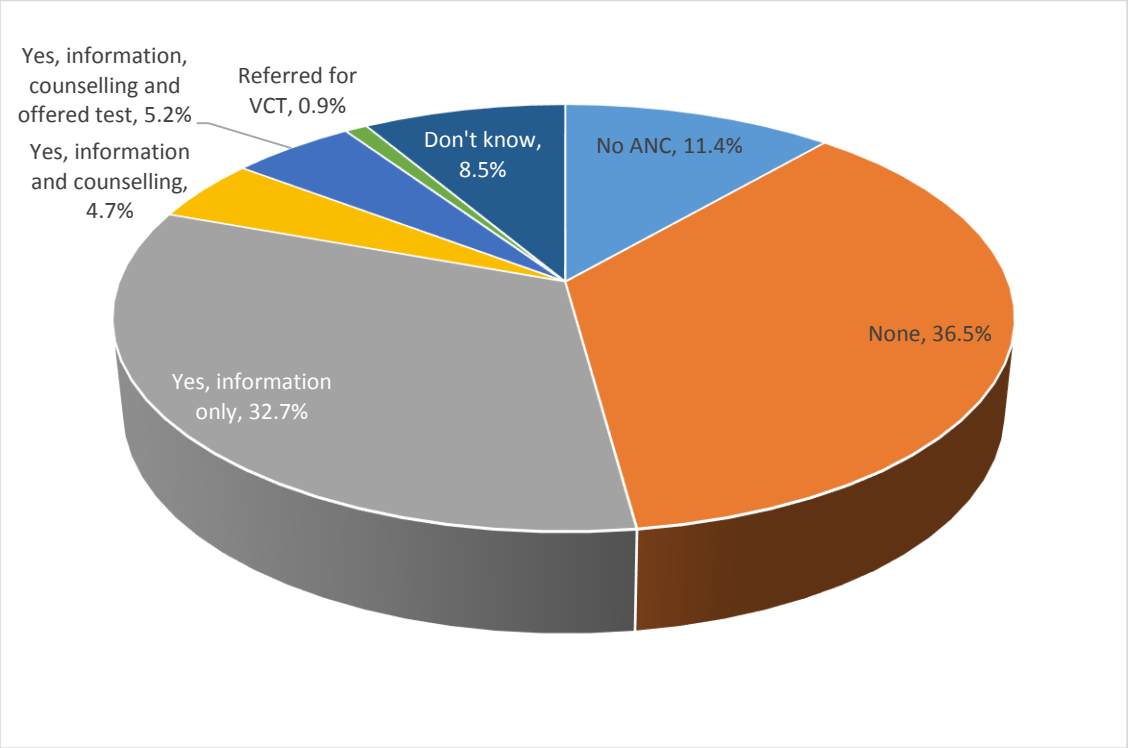


Figure 30: Tetanus toxoid received during last pregnancy and before the last pregnancy (N=211)



Please note that the 11.4% shown for No ANC is the proportion of women who did not attend ANC during the last pregnancy; the same proportion is depicted for 'Other' before the last pregnancy because this question was not asked to those women who did not attend ANC during the last pregnancy and thus does not reflect those who did not attend ANC before the last pregnancy.

Figure 31: HIV services received during ANC visits as reported by the women respondents

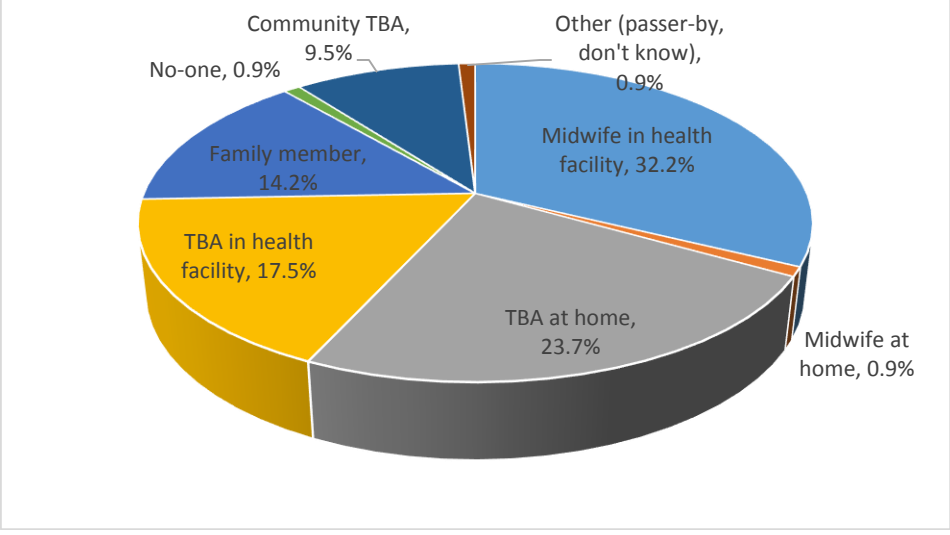


Delivery

The survey found that 48.8% of women gave birth to their youngest child at home (N=211, n=103, 95% CI 42.15-55.52). 26.1% (n=55, 95% CI 20.61-32.38) gave birth at a hospital, 23.7% (n=50, 95% CI 18.46-29.87) in a local clinic and 1.4% in another location (roadside and ambulance) (n=3, 95% CI 0.48-4.10).

Women delivering their children in a health facility is a positive health practice that is struggling to show a significant increase over the years; however, compared to the 2012 survey result (45.1%; p-value = 0.3125) there has been no significant decline in those attending a health facility for delivery. The proportion of women who were attended at their delivery by a skilled attendant showed a steady increase until the 2012 survey (from 34.5% in 2009 to 53.2% in 2010) when a sharp decline was seen (to 45.9%) and when compared to this survey's result there is yet another (significant) decline.

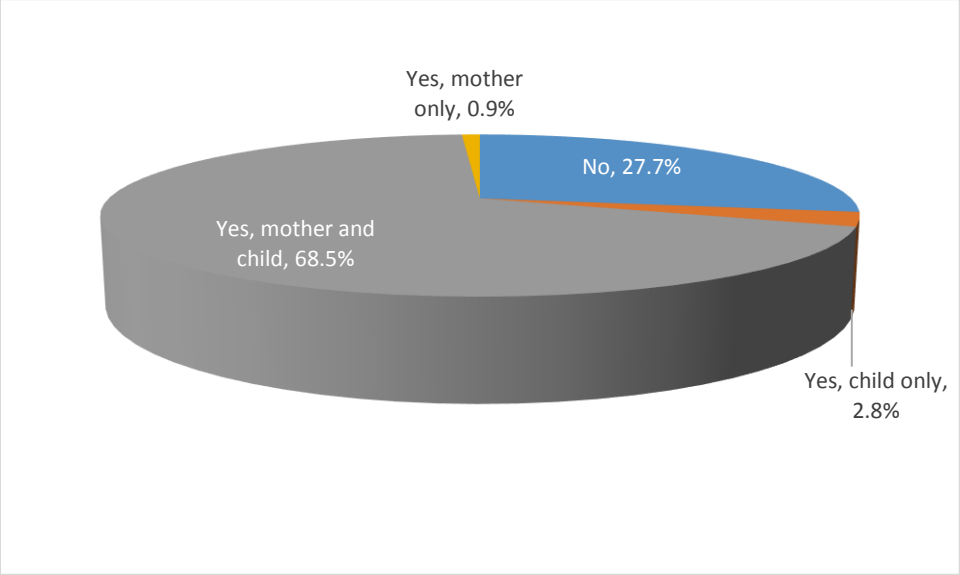
Figure 32: Delivery attendant (N=211)



Overall 33.2% (n=70, 95% CI 27.17-39.78) of women had a skilled attendant at delivery (midwife). In total 49.8% (n=105, 95% CI 43.08-56.45) of women delivered in a health facility (hospital or local clinic); 32.2% (n=68, 95% CI 26.29-38.80) delivered in a health facility with the assistance of a midwife and 17.5% (n=37, 95% CI 13.00-23.230 delivered in a health facility with the assistance of a TBA.

Post Natal Care

Figure 33: PNC received by women and children as reported by the respondents



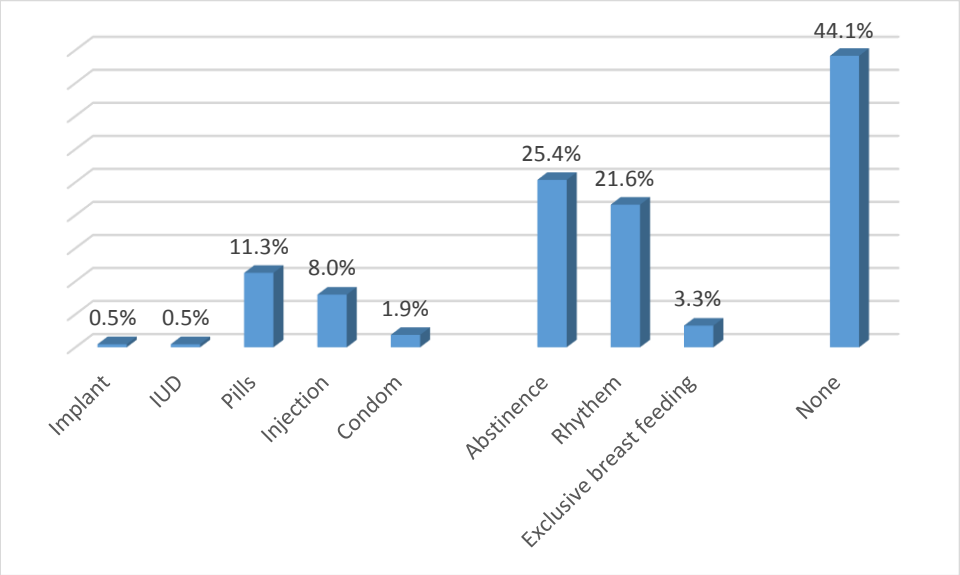
Of the 154 women who reported that either themselves and/or their child had a PNC the average time reported for when the PNC was conducted was 9 days after birth; the maximum time was 45 days and the minumum time was the actual day of delivery (0 days).

Child Spacing

Of the total respondents (N=213) only 39.0% (n=83, 95% CI 32.67-45.66) knew to access child spacing services at the clinic and/or hospital. The majority of the remainder of respondents did not know where to access child spacing services (57.8%, n=123, 95% CI 51.03-64.19), 2.4% (n=5, 95% CI 1.01-5.38) stated a traditional healer and two respondents refused to answer (0.9%, 95% CI 0.26-3.36).

The respondents were then asked what types of contraception methods they knew. The figure below shows the respondents responses to this question.

Figure 34: Knowledge of contraception methods as stated by the respondents



Of the total respondents (N=213), 44.1% (n=94, 95% CI 37.63-50.85) did not know any type of contraception, modern or traditional; 6.6% (n=14, 95% CI 3.96-10.73) knew only one type of modern contraception[45], 5.6% (n=12, 95% CI 3.25-9.59) knew two types and only 1.4% (n=3, 95% CI 0.48-4.06) knew three types.

4.13 HIV

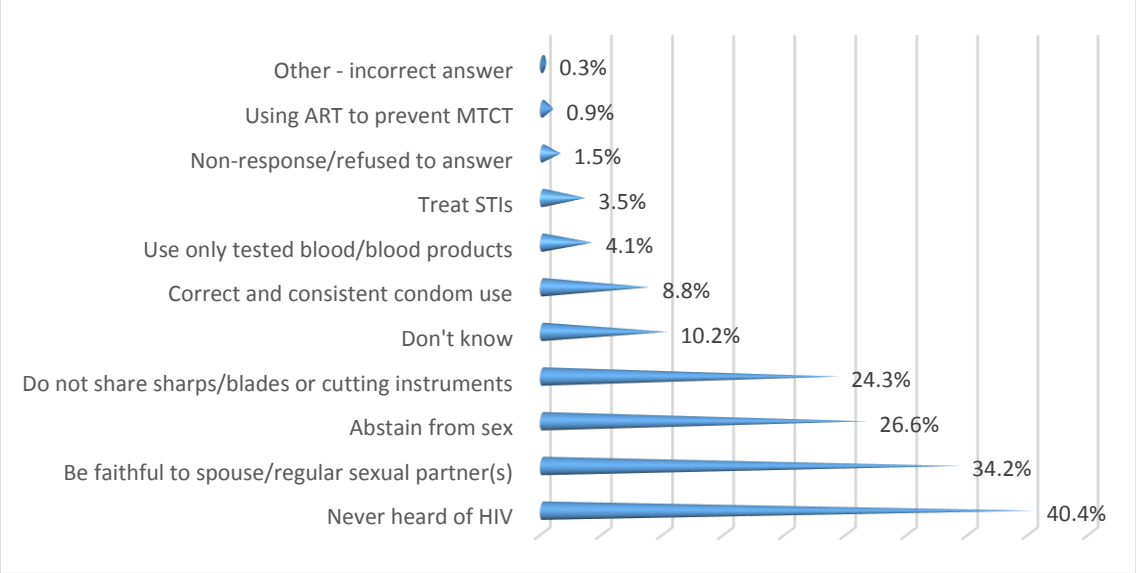
The HIV survey was asked to respondents in households with and without children <5 years old. The demographics of the respondents who took part in the HIV survey (N=342) are outlined below:

- 84.5% (n=289, 95% CI 80.29-87.95) of the respondents were female, whilst 15.5% (n=53, 95% CI 12.05-19.71) were male;
- The majority are married with children (74.3%, n=254, 95% CI 69.38-78.61), 14.3% (n=49, 95% CI 11.01-18.44) are widowed, 7.3% (n=25, 95% CI 5.00-10.57) were never married, 2.6% (n=9, 95% CI 1.39-4.92) are divorced or separated and 1.5% (n=5, 95% CI 0.63-3.38) are married but with no children.
- 67.0% (n=229, 95% CI 61.81-71.73) are illiterate, 21.4% (n=73, 95% CI 17.33-25.99) can read and write, 6.7% (n=23, 95% CI 4.52-9.89) have completed primary school and 5.0% (n=17, 95% CI 3.13-7.82) have completed secondary school.

Respondents were asked how HIV can be prevented, 342 respondents answered this question. 47.7% of respondents provided a correct response to this question (n=163, 95% CI 42.42-52.95); 12.9% provided one correct response (n=44, 95% CI 9.73-16.83), 20.5% gave two correct responses (n=70, 95% CI 16.53-25.06), 11.4% gave three correct responses (n=39, 95% CI 8.45-15.21) and 2.9% gave four or more correct responses (n=10, 95% CI 1.60-5.30). Therefore 34.8% of respondents could indicate two or more ways to prevent HIV (n=119; 95% CI 29.94-39.99). When compared to the 2012 survey result (38.6%) this is not a significant decline (p-value = 0.32218).

[45] Modern types of contraception include implant, IUD, pills, condom and injections.

Figure 35: Knowledge of how HIV can be prevented (N=342)



Respondents were asked how HIV can be contracted, 199 respondents answered this question (those who had never heard of HIV and those who refused to answer for the previous question on prevention were excluded from this analysis). 81.4% of respondents provided a correct response to this question (n=162, 95% CI 75.43-86.20); 25.1% provided one correct response (n=50, 95% CI 19.61-31.58), 35.2% gave two correct responses (n=70, 95% CI 28.88-42.03), 15.6% gave three correct responses (n=31, 95% CI 11.20-21.26) and 4.5% gave four correct responses (n=9, 95% CI 2.40-8.37).

Therefore 55.3% of respondents could indicate two or more ways to contract HIV (n=110; 95% CI 48.33-62.02).

Figure 36: Knowledge of how HIV can be contracted (N=199)

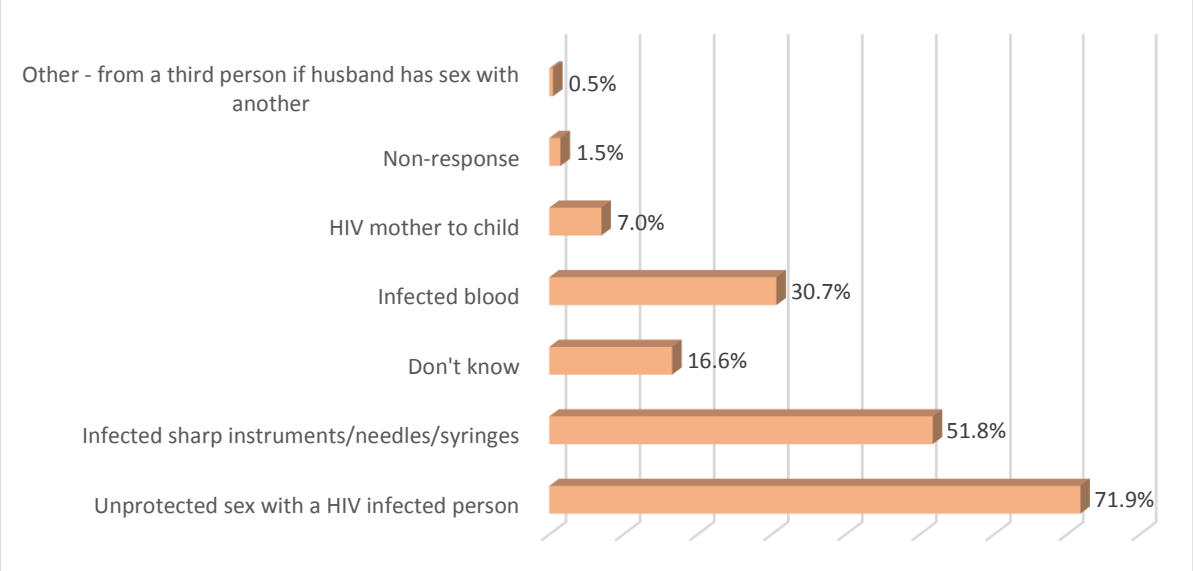
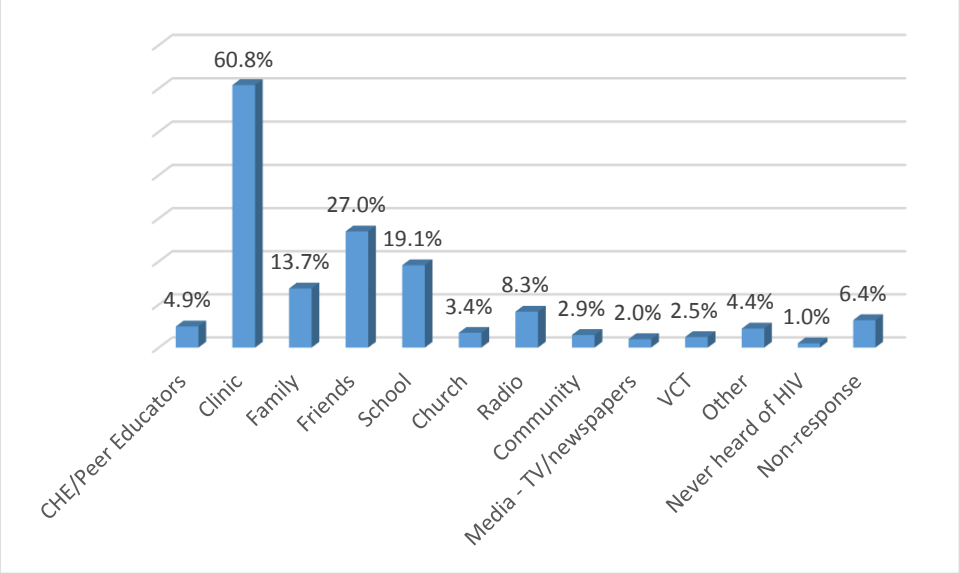


Figure 37: Respondents' stated HIV information sources (N=204)

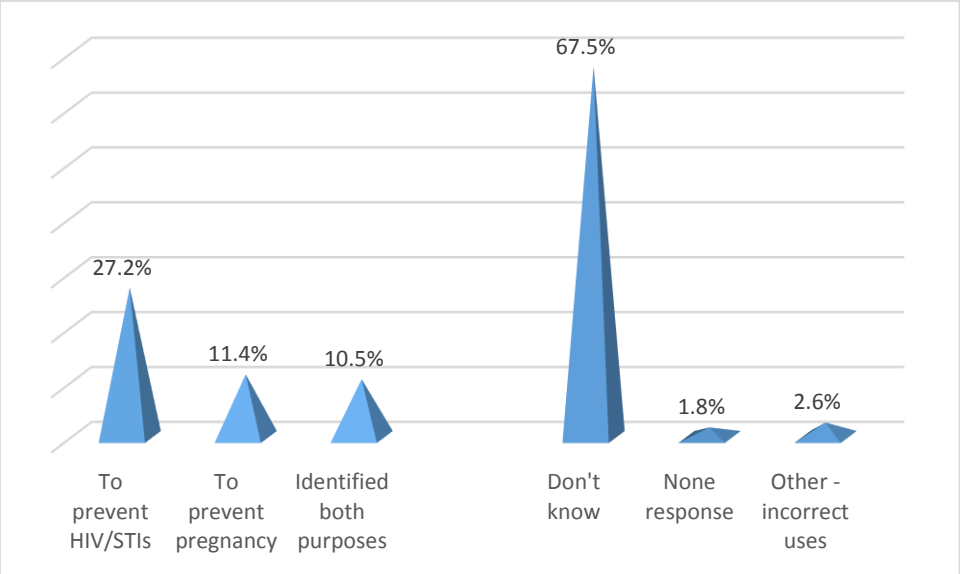


'Other' responses included Market (3), football stadium (1), public rally (1), read in books (1), Red Cross training (1), army barracks (1) and World Aids Day (1).

The two respondents who stated that they had never heard of HIV for this question had answered the previous questions relating to prevention and contracting HIV with correct answers.

65.7% of respondents (N=204, n=134, 95% CI 58.94-71.86) said that they would not buy food from a shopkeeper who was known to be living with HIV; 31.9% (n=65, 95% CI 25.85-38.54) said they would buy from a shopkeeper who was known to be living with HIV and the remainder said they did not know what they would do (2.5%, n=5, 95% CI 1.05-5.61). Those who would buy food from a HIV shopkeeper has shown a significant increase compared to the result of the 2012 survey (22.7%; p-value = 0.0226).

Figure 38: Respondents' knowledge of what a condom is used for (N=342)



Respondents of the HIV survey were asked what they would do if they discovered they had an STI. Their responses are set out in the figure below.

Figure 39: Respondents' responses relating to what they would do if they had a STI (N=342)

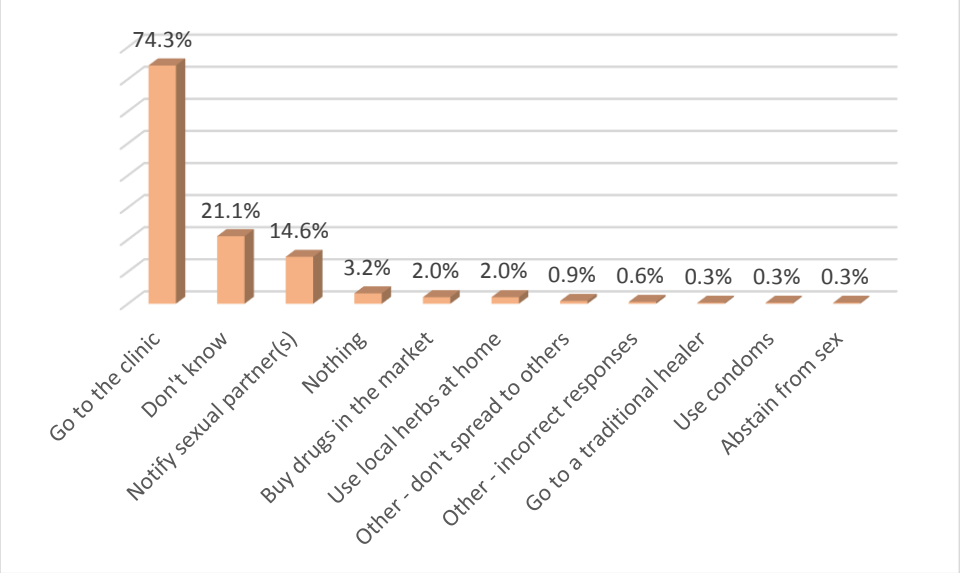
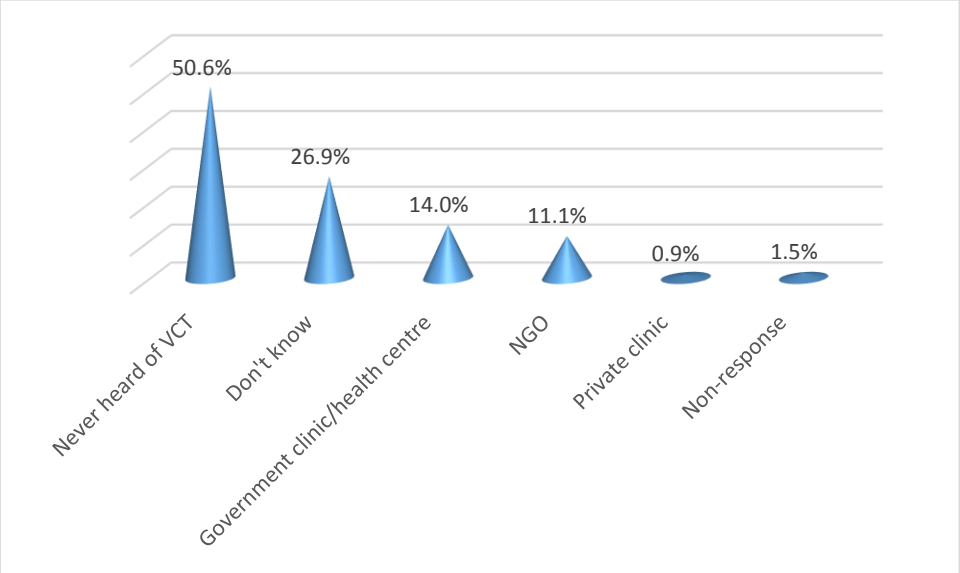


Figure 40: Respondents' knowledge of the location of VCT services



5 Limitations of the survey

- Determining age is difficult and age on health cards is unreliable therefore not used. A local seasonal calendar and an events calendar were used but will never be 100% precise as a birth certificate would be therefore they may have been some discrepancy in the ages recorded compared to the true age of the child;
- Although the survey team informed respondents that the survey was an information gathering exercise only, unrelated to any kind of distribution, it is possible that some respondents may have exaggerated or misrepresented their situation slightly in the hopes of receiving some benefit. This would not have affected the anthropometric measurements, but may have affected variables such as the reported amount of food stores or water availability and access.
- Digital Data Gathering (DDG) for a survey using mobile phones was piloted during this survey for the first time. Consequently there were some issues with the set-up of the anthropometric and child questionnaires on the questionnaire and therefore only one child's data could be recorded on the phones; the other children that were in the house their data had to be recorded on traditional paper questionnaires. This entailed the need for some manual data entry into the database generated by the DDG software.
- The data from one cluster, seven households, could not be downloaded from the DDG device even with the support of mFieldwork (reason unknown) therefore this data was excluded from the analysis (Cluster 38).
- Population figures for the villages proved very difficult to obtain and the population figures that were eventually used for the cluster selection would without doubt have some errors. The difficulty in obtaining population data follows the displacement of people due to recent insecurity.
- The questionnaire was not translated into the local language (Dinka) but kept in English; however training on each question and the correct (agreed upon) translation was carried out during the training. The disadvantage of this is whether the enumerators remember the correct translations to use during the survey.
- The local chief was used when creating the segmentation of the cluster(s) hence they might have introduced some bias into the selection process. However the design effects are all within the homogenous range.
- GOAL staff were organised for data collection due to limited capacity of the local people and budget constraints; hence they might have introduced some bias into the survey results.

6 Recommendations

The following recommendations are to be applied during 2015.

To scale up WASH work on sanitation and latrine use, including undertaking two barrier analysis, one on the reluctance to use latrines and the other on the reluctance to have designated hand washing facilities with soap.

To contribute to a reduction in the prevalence of GAM by increasing household food production, focusing on crops that will address the micro-nutrient deficiencies in diet, and to conduct a barrier analysis to understand the barriers limiting exclusive breastfeeding.

Focus on building more community ownership and supporting communities to develop and implement their own ideas in response to key issues found in the MICS results.

Increase the uptake of preventative services through greater community engagement in Agok.

Conduct DBCs to understand the barriers to ANC, PNC, FP and TT uptake in Agok.

Discuss the CLTS approach among agencies working in Agok and agree on a collaborated approach with support through the Wash Cluster should improve possibilities of success of this intervention.

7 Appendices

Appendix 1: Cluster selection for the February 2015 MICS

Boma	Village	Population 2015	Cluster
Gungbial	Gongbial	432	1
Mulmul	Mulmul, Ameth Beek and Bukchop	576	
Nyinkuac	Nyinkuac and Rum-Ajak	367	2
	Abyei Jokyom and Banychol Malual	720	
Dungop	Wunruok and Duop	648	RC
Lou	Tirawan & Ranypiny	403	3
	Mijak	576	
	Fod Agok & Ayom buony	396	4
	Nyobariik & Wejwej	216	
	Jamena and Longbolok	295	
	Nyin Jou	1447	5,6
	Abothok	2426	7,8,9
	Wun Aran	274	
	Wunokom	504	10
	Titak	374	
Tajalei	Nyintar	482	11
	Gung Mabil	209	
	Wunchuei (Ganga)	590	12
	Wonbiooch	187	
	Makerbanyjok	598	13
	Maker thou	540	
	Nyial chuor	713	14
	Agach	446	RC
	Wunpeth	734	15
	Majbong	878	16
Mabok	Rumameer	504	
	Wunchuei	403	17
	Awal & Koladet	439	
	Achelkow	360	18
	Mathaing Dill	511	
	Agok	2160	19,20,21
	Mayom Ngok	886	22
	Makuei Wut	324	
	Juljuk (East and West)	1584	23,24
	Maker Aniet	1152	25
	Mijak Deng Kaya	252	RC
	Mijakol	1130	26
	Miyen Achok	180	
	Miyen Jerdel	252	
	Wawchin	540	27

	Gakluom and Kolwei	295	
	Gung kuel and Gigou	230	RC
	Agany dil and Mabok	432	
	Thitheinyin & Ayach	310	28
	Mading Deng Mathiang	432	
	Mading Kanisa	871	29
	Mading Yir Yir	526	30
	Ajak thony	713	
	Angot 1 & 2	281	31
	Nyanguong	252	
	Gailum	439	32
	Dhanar	576	
	Mabiordil	252	33
	Rumbek & Malual Riba & Rubjaba	727	
	Magar	360	34
	Gumcholmonytoch	324	
	Kol Louth	403	35
	Maker Awat wat	511	
	Nyiel & Mijok Alieu	857	36
	Marol Ayuang	288	37
Marial Achak	Rum Koor	886	38
Awolnhom	Achech Nhial	540	
	Mabil	266	RC
	Gil Dau	403	
	Malual Aleu	626	39
	Minyang Anyiel	324	
	Athony	1080	40
	Korioc	194	41
	Kadhian	274	
	Ditwengnhom	187	
	Awolnhom	317	42
	Rupnyin	302	
Nong	Aganyachueng	331	
	Mading Achueng	403	43
Maker	Aganytok	180	

Appendix 2: Events Calendar

MONTH	ANNUAL EVENTS	LOCAL EVENTS											
		Age in mnth	2010	Age in mnth	2011	Age in mnth	2012	Age in mnth	2013	Age in mnth	2014	Age in mnth	2015
JANUARY			New year celebrations General elections	**49**	New year celebrations South Sudan separation	**37**	New year celebrations Death of Great artist	**25**	South Sudan Referendum	**13**	New year celebrations	**1**	New year celebration
FEBRUARY				**48**		**36**		**24**	Referendum result announcement	**12**	School open	**0**	Schools open
MARCH	Clearing of farms	**59**	Bagara and SPLA battle, Women day	**47**	Women Day	**35**	Kacha SPLA, Women day	**23**	Women day	**11**	Women day		
APRIL	Starting of rains Easter celebration	**58**	Primary elections	**46**	Abyei war	**34**		**22**		**10**	Incident of Maker, Measles campaigns		
MAY	SPLA DAY	**57**		**45**	Abyei war	**33**	SPLA DAY	**21**	SPLA DAY, Chief killed	**9**	SPLA Day		
JUNE		**56**	Separation of soldiers	**44**		**32**	Long rains and start of planting	**20**		**8**			
JULY	SS INDEPENDANCE DAY	**55**	Dr. John Garang memorial	**43**		**31**		**19**	INDEPENDENCE	**7**	Muslim holiday		
AUGUST	Mary celebrations (Catholics)	**54**	Heavy rainfall	**42**		**30**		**18**		**6**			
SEPTEMBER		**53**		**41**	Border closed Flood	**29**	Referendum campaign	**17**		**5**			
OCTOBER	Daniel Comboni day Harvest of crops	**52**		**40**		**28**		**16**	Abyei Referendum	**4**			
NOVEMBER		**51**	Matrys day	**39**		**27**	Voter registration for 2011 referendum	**15**		**3**			
DECEMBER	CHRISTMAS	**50**	Christmas	**38**		**26**	Christmas	**14**	South Sudan Crisis	**2**			

Appendix 3: Survey questionnaire

MICS SURVEY 2015 : Version - 3

Q 1: Take the GPS (Type : geopoint) (GPS)

Inst 2: Hello, my name is _____ and I am working with GOAL. We're undertaking an anthropometric and health survey. The information we gather will help GOAL implement programs that will improve the health of people in your community. We would like to ask you some questions as well as weigh and measure any children under 5 years old. Your participation is voluntary and completely confidential; you do not have to answer any questions that you do not want to answer. You may end this interview at any time. No one will give you money or gifts to respond to these questions. Your honest answers to these questions will help us make sure GOAL develops programs that are tailored to benefit your community. We greatly appreciate your help in responding to this survey. It will take about 30 minutes to complete.

Q 3: Would you like to participate?

O 1: Yes O 2: No

Q 4: Team Number

Q 5: Cluster Number

Q 6: HH ref No.

Q 7: State O 1: Abyei Administrative Area (AAA)

Q 8: County O 1: Abyei Administrative Area (AAA)

Q 9: Payam

O 1: Abyei Town O 2: Mijak O 3: Rumameer

Q 10: Boma

O 1: Abyei Jong Yom
O 2: Abyei Thony
O 3: Mabok
O 4: Marial
O 5: Tajalei
O 6: Leu
O 7: Nyinkuac
O 8: Gukbial
O 9: Other

Q 12: Village
Inst 14: The following questions to be asked in EVERY household sampled

Q 15: How many MALES live in this HH in total?(all ages)

Q 16: How many FEMALES live in this HH in total?(all ages)

Q 17: How many people live in this HH in TOTAL?(HH def = people eating form the same cooking pot)

Q 18: How many in the HH are pregnant women? (Type : int)

Q 19: What is the origin of the HH?
O 1: Permanent residents,
O 2: Returnees (returned within the last 12mths)
O 3: Nomads
O 4: IDPs (in last 12 mths)
O 5: IDPs (1-5yrs)

O 6: IDPs (5yrs +)
O 7: Refugees (in last 12mths)
O 8: Refugees (1-5yrs)
O 9: Refugees (5yrs +)
O 10: Don't know

Q 20: Is the head of this HH male or female?
O 1: Male
O 2: Female

Q 21: Is the respondent male or female?
O 1: Male
O 2: Female

Q 22: Do you have any children between 0-59 months?
O 1: Yes
O 2: No

Q 24: How many males(0-59 months)?

Q 25: How many females(0-59 months)?

Q 26: So, the total Number of children in this household between 0-59 months is:

Q 27: Child name

Q 28: Gender of the child
O 1: Male
O 2: Female

Q 29: Exact Age in months

Q 30: Weight in kg

Q 31: Height in cm

Q 32: Does the child suffer from Oedema?
O 1: Yes
O 2: No

Q 33: Measure the MUAC mm

Q 34: Is the child currently, or has been in the previous 6 months, in a nutrition programme?
O 1: No
O 2: SFP
O 3: OTP
O 4: SC TFC
O 5: Nutrition/NIPP circle

Q 75: The following questions are to be conducted in EVERY household with children 0-59 months from the random starting point. To be completed for each child 0-59 months by interviewing the mother/carer of the child

Q 76: Last night, did this child sleep under a LLITN?
O 1: Yes
O 2: No

Q 77: Has the child been ill in the past 2 weeks?
O 1: Yes
O 2: No

Q 78: Type of Illness
O 1: Malaria/fever
O 2: Diarrhoea
O 3: Cough/difficult breathing
O 4: Skin infection
O 5: Eye infection
O 6: Blood in stool
O 7: Measles

O 8: Other

Q 80: Treatment sought
O 1: None sought
O 2: Hospital
O 3: PHCC/PHCU
O 4: Mobile/Outreach clinic
O 5: Village Health Care Worker
O 6: Private physician
O 7: Relative/Friend
O 8: Traditional Practitioner
O 9: Bought drugs from shop
O 10: Bought drugs from pharmacy
O 11: Other

Q 82: If the child had fever, how many days after the fever began did you first seek treatment for fever from a health facility?
O 1: No treatment from health facility
O 2: Same day (within 24 hours)
O 3: Next day or later (more than 24 hours)

Q 83: What would you do if your child had diarrhoea?
O 1: Don't know
O 2: Go to clinic
O 3: Go to traditional healer
O 4: Use local herbs at home
O 5: Buy drugs in the market
O 6: Nothing
O 7: Take more fluids
O 8: Take ORS/Salt Sugar solution
O 9: Other

Q 85: What would you do if your child had a cough with rapid/difficult breathing?
O 1: Don't know
O 2: Go to clinic
O 3: Go to traditional healer
O 4: Use local herbs at home
O 5: Buy drugs in the market
O 6: Nothing
O 7: Take more fluids
O 8: Take ORS/Salt Sugar solution
O 9: Other

Inst 87: The following questions are about Vaccination

Q 88: Vitamin A in last 6 months
O 1: Yes (with card)
O 2: Yes (mother's recall)
O 3: No
O 4: Don't know /remember

Q 89: Measles Vaccine
O 1: Yes (with card)
O 2: Yes (mother's recall)
O 3: No
O 4: Don't know /remember

Q 90: Penta3 vaccine
O 1: Yes (with card)
O 2: No
O 3: Don't know /remember

Inst 91: The following questions are to be conducted in EVERY household with children 0-59 months from the random starting point. To be completed for each child 0-59 months by interviewing the mother/carer of the child

Q 92: How long after birth did you first put the child to the breast?
O 1: Never breastfed
O 2: Immediately (Less than 1 hour after birth)
O 3: From 1-24 hours

O 4: From 25-48 hours
O 5: After 48 hours

Q 93: Are you currently breast feeding this child? O 1: Yes
O 2: No

Q 94: What liquids was the child given yesterday during the day and night?
O 1: None
O 2: Vitamin drops or medicines as drops
O 3: ORS
O 4: Plain water
O 5: Infant formula
O 6: Milk (tinned, powdered or fresh animal)
O 7: Juice or juice drinks
O 8: Clear broth
O 9: Other water based liquids
O 10: Sour milk or yoghurt
O 11: Thin porridge
O 12: Breast milk
O 13: Other

Q 96: What foods was the child given yesterday during the day and night?
O 1: Nothing at all
O 2: Cereals
O 3: Legumes/ nuts
O 4: Roots & tubers
O 5: Meat / poultry/ offal
O 6: Fish/ sea food
O 7: Milk/ milk products
O 8: Vegetables
O 9: Fruits
O 10: Eggs
O 11: Oil/ fats
O 12: Sugar/ honey
O 13: Other

Q 98: How many times did your child eat yesterday

Q 99: How much liquid did you offer this child to drink during the last episode of illness compared to when s/he is healthy? O 1: Nothing to drink
O 2: Much less
O 3: Somewhat less
O 4: About the same
O 5: More than usual
O 6: Do not know/ remember

Q 100: How much food did you offer this child to eat during the last episode of illness compared to when s/he is healthy?
O 1: Never gave food
O 2: Much less than normal
O 3: Somewhat less
O 4: About the same
O 5: More than usual
O 6: Do not know/ remember

Q 102: What is the HH's main water source during the DRY season?
O 1: Borehole (hand pump)
O 2: Protected shallow well (hand dug well, covered, with a hand pump)
O 3: Open shallow well
O 4: Protected spring
O 5: River /stream/swamp
O 6: HH connection/ stand pipe/ tanker
O 7: Dam/ pond
O 8: Other (specify)

Q 104: What is the HH's main water source during the WET season?
O 1: Borehole (hand pump)
O 2: Protected shallow well (hand dug well, covered, with a hand pump)
O 3: Open shallow well
O 4: Protected spring

O 5: River /stream/swamp
O 6: HH connection/ stand pipe/ tanker
O 7: Dam/ pond
O 8: Other (specify)

Q 106: How long does it take to walk to the nearest improved water source?
O 1: <30 mins
O 2: 30 mins or more
O 3: Don't know

Q 107: How many litres of water did the HH use in total yesterday, excluding water for clothes washing

Q 108: What is done to the water BEFORE household members drink it?
O 1: Nothing
O 2: Boiling
O 3: Filtering with a cloth
O 4: Letting it settle
O 5: Chlorination
O 6: Filtering with sand ceramic filter
O 7: Other

Q 110: How do you store drinking water?
O 1: In containers (bucket, Jerry Can, pot, bottle)
O 2: Roof Tank or Cistern
O 3: No water stored

Q 111: If in containers, may I see the containers, please?
O 1: Yes
O 2: No

Q 112: OBSERVATION: What type of containers are these?
O 1: Narrow mouthed
O 2: Wide mouthed
O 3: Both types

Q 113: OBSERVATION: Are the containers covered?
O 1: None are
O 2: Some are
O 3: All are

Q 114: OBSERVATION: Are the containers clean (eg no green algae on inside, opening and handle free from dirt/dust)
O 1: None are
O 2: Some are
O 3: All are

Q 115: Where does the HH usually defecate?
O 1: Undesignated open area
O 2: Designated open area
O 3: Hole
O 4: HH latrine
O 5: Communal latrine
O 6: Neighbour's latrine
O 7: Other

Q 117: When do you usually wash your hands?
O 1: Never
O 2: After defecating
O 3: After handling child faeces
O 4: Before cooking
O 5: Before eating
O 6: Before breast feeding
O 7: Other

Q 119: Can you show me where you wash your hands and what you normally use to wash your hands?
O 1: Inside/near toilet facility
O 2: Inside/near kitchen/cooking place
O 3: Elsewhere in yard

O 4: Outside of yard
O 5: No specific place
O 6: No permission to see

Q 120: OBSERVATION: Is there soap, detergent or locally used cleaning agent?
O 1: None
O 2: Soap
O 3: Ash
O 4: Other
Q 122: What is the HHs main source of cash income in the last 30 days?
O 1: None
O 2: Cash crops
O 3: Food crops for selling
O 4: Sale of livestock
O 5: Sale of animal products
O 6: Sale of fish
O 7: Sale of natural resources (firewood; charcoal; grass)
O 8: Sale of food aid
O 9: Casual labour
O 10: Skilled labour
O 11: Salaried work (regular paid employment e.g teacher)
O 12: Petty trading
O 13: Small business
O 14: Family support
O 15: Other

Q 123: Specify cash crop source

Q 125: What is the HHs 2nd main source of cash income in the last 30 days?
O 1: None
O 2: Cash crops
O 3: Food crops for selling
O 4: Sale of livestock
O 5: Sale of animal products
O 6: Sale of fish
O 7: Sale of natural resources (firewood; charcoal; grass)
O 8: Sale of food aid
O 9: Casual labour
O 10: Skilled labour
O 11: Salaried work (regular paid employment e.g teacher)
O 12: Petty trading
O 13: Small business
O 14: Family support
O 15: Other

Q 126: Specify cash crop source

Q 128: Has this HH's income increased in the last 12 months?
O 1: Yes
O 2: No
O 3: Don't know

Q 129: What is the HHs main source of food in the last 7 days?
O 1: Own production
O 2: Work for food
O 3: Gifts
O 4: Purchased (market/ shop)
O 5: Food aid
O 6: Hunting
O 7: Fishing
O 8: Wild food (gathering)
O 9: Other

Q 131: What is the HHs 2nd main source of food in the last 7 days
O 1: Own production
O 2: Work for food
O 3: Gifts
O 4: Purchased (market/ shop)
O 5: Food aid
O 6: Hunting

O 7: Fishing
O 8: Wild food (gathering)
O 9: Other

Q 133: What crop types did you cultivate in the current/most recent growing season?
O 1: None/did not cultivate
O 2: Sorghum
O 3: Maize
O 4: Ground nut
O 5: Sesame
O 6: Okra
O 7: Cowpeas
O 8: Beans
O 9: Other

Q 135: How does the harvest compare to the previous season?
O 1: Did not cultivate
O 2: No harvest
O 3: Produced less
O 4: Produced the same
O 5: Produced more
O 6: Don't know

Q 136: From the last harvest did your HH produce for your own food consumption, compared to the harvest before?
O 1: No crops
O 2: More crops
O 3: Less crops
O 4: Same amount of crops
O 5: Did not harvest
O 6: Don't know

Q 137: OBSERVATION: What food stocks are available in the house on the day of the survey?
O 1: None
O 2: Cereals/Grains/Tubers
O 3: Meat/Fish
O 4: Milk Products
O 5: Vegetables/Fruit
O 6: Pulses/Legumes
O 7: Eggs
O 8: Other
O 9: No permission to see

Q 139: What is 1st major challenge to crop production and productivity in your community?
O 1: None
O 2: Crop pests
O 3: Crop diseases
O 4: Drought/erratic rainfall
O 5: Lack of access to agricultural inputs (seeds, tools, …)
O 6: Lack of access to 'good' markets for selling crop produce
O 7: Labour Shortage
O 8: Inaccessible land due to insecurity
O 9: Other
O 10: Don't know

Q 141: What is 2nd major challenge to crop production and productivity in your community?
O 1: None
O 2: Crop pests
O 3: Crop diseases
O 4: Drought/erratic rainfall
O 5: Lack of access to agricultural inputs (seeds, tools, …)
O 6: Lack of access to 'good' markets for selling crop produce
O 7: Labour Shortage
O 8: Inaccessible land due to insecurity
O 9: Other
O 10: Don't know

Q 143: What is the 3rd major challenge to crops production and productivity in your community?
O 1: None
O 2: Crop pests
O 3: Crop diseases
O 4: Drought/erratic rainfall
O 5: Lack of access to agricultural inputs (seeds, tools, …)
O 6: Lack of access to 'good' markets for selling crop produce
O 7: Labour Shortage
O 8: Inaccessible land due to insecurity
O 9: Other
O 10: Don't know

Q 146: How many ANC visits did you attend during your last pregnancy?

Q 147: During ANC visits, did you receive tablets to prevent you getting malaria?
O 1: No/ no ANC
O 2: Once (card)
O 3: Twice or more (card)
O 4: Once (recall)
O 5: Twice or more (recall)
O 6: Don't know

Q 148: Did you receive Iron tablets for at least 30 days during your pregnancy?
O 1: Yes
O 2: No
O 3: Don't know

Q 149: During your last pregnancy did you receive such an injection for tetanus toxoid?
O 1: Once (card)
O 2: Twice (card)
O 3: Three times or more (card)
O 4: Once (recall)
O 5: Twice (recall)
O 6: Three times or more (recall)
O 7: Don't know

Q 150: Have you received BEFORE the last pregnancy an injection in the arm to prevent your baby from getting tetanus?
O 1: Once (card)
O 2: Twice (card)
O 3: Three times or more (card)
O 4: Once (recall)
O 5: Twice (recall)
O 6: Three times or more (recall)
O 7: Don't know

Q 151: Did you get any HIV services during an ANC visit?
O 1: No
O 2: Yes information only
O 3: Information and counselling
O 4: Information counselling and offered a HIV test
O 5: Referred for VCT
O 6: Don't know
O 7: Refuse to answer

Q 152: Where did the birth of your YOUNGEST child take place?
O 1: At home (your own/ neighbour/ relative/ friend)
O 2: Local clinic
O 3: Hospital
O 4: Other

Q 154: Who helped with the birth?
O 1: No one
O 2: Family member/friend/neighbour
O 3: TBA
O 4: Doctor
O 5: Nurse

O 6: Midwife
O 7: Other

Q 156: After delivery, did any health care provider or TBA check on your health or the health of your new born?
O 1: No
O 2: Yes (mother only)
O 3: Yes (child only)
O 4: Yes (mother & child)

Q 157: How many days after delivery was this check made?

Q 158: Do you know a place where you can access child spacing services? If yes, where?
O 1: Don't know
O 2: Clinic / hospital
O 3: Traditional healer
O 4: Market / drug store
O 5: Other
O 6: Refused to answer

Q 160: What methods of contraception do you know to avoid or delay getting pregnant?
O 1: None
O 2: Injections
O 3: Implant
O 4: IUD
O 5: Diaphragm
O 6: Condom
O 7: Pills
O 8: Exclusive breastfeeding
O 9: Rhythm
O 10: Abstinence
O 11: Other

Q 163: How many minutes' walk is your home from a health facility?
O 1: <30 mins
O 2: 30 mins - <1 hr
O 3: 1 hr - <2 hrs
O 4: 2+ hrs

Q 164: Do you consider getting to the health facility easy?
O 1: Yes
O 2: No

Q 165: How would you rate the quality of the service you receive at the health centre?
O 1: Don't know
O 2: Poor (specify)
O 3: Average
O 4: OK
O 5: Good
O 6: Very good
O 7: Excellent
O 8: Other

Q 166: If Poor, Specify

Q 168: How do you get malaria?
O 1: Don't know
O 2: Mosquitoes
O 3: Flies
O 4: Dirty water
O 5: Eating bad food
O 6: Other

Q 170: How can you help to prevent getting malaria?
O 1: Don't know
O 2: Use an ITN
O 3: Cover up at dusk

O 4: IRS
O 5: Removal of mosquito breeding sites
O 6: Other

Q 172: Do you have LLITN in you HH ?
O 1: Yes
O 2: None
O 3: Don't Know

Q 173: How many in total?

Q 174: What causes diarrhoea?
O 1: Don't know
O 2: Contaminated food
O 3: Contaminated water
O 4: Contaminated hands
O 5: Flies
O 6: Eating greens
O 7: Other

Q 176: How can you help to prevent diarrhoea?
O 1: Don't know
O 2: Washing hands
O 3: Use latrine or bury faeces
O 4: Boil drinking water
O 5: Exclusive breast feeding
O 6: Other

Q 178: How would you rate the general status of your family's health compared to last year?
O 1: The same
O 2: Improved slightly
O 3: Improved significantly
O 4: Deteriorated slightly
O 5: Deteriorated dramatically

Q 179: If there is a positive change can you indicate what has caused this change?
O 1: Health services have improved
O 2: Cost of health services more affordable
O 3: More access to food
O 4: Other

Q 181: If there is a negative change can you indicate what has caused this change?
O 1: Health services have become worse
O 2: Cost of health services too expensive
O 3: Less access to food
O 4: Less access to potable water
O 5: Chronic illness in the HH
O 6: Other

Q 184: TOTAL people who have joined HH since:

Q 185: Of the total, how many are <5s

Q 186: TOTAL people who have left HH since:

Q 187: Of the total who left, how many are <5s

Q 188: No. of live births since

Q 189: TOTAL No. of deaths in the family since:

Q 190: Of these deaths how many were children <5

Q 191: Cause of death of family members
O 1: Diarrhoea
O 2: Fever (Malaria)
O 3: ARI/Pneumonia/Cough (difficulty breathing)
O 4: Malnutrition
O 5: Measles

O 6: Accident
O 7: Violence related
O 8: Neonatal Mortality
O 9: Acute Flaccid Paralysis (Polio)
O 10: Maternal Mortality
O 11: Meningitis
O 12: Old Age
O 13: Unknown
O 14: Other
O 15: No death

Inst 199: The following questions to be asked in EVERY household with children 0-59 months from the random starting point.To be asked to ONE randomly picked respondent (between 16 - 45 years) in every HH surveyed
Q 200: Age of respondent

Q 201: Gender of respondent
O 1: Male
O 2: Female

Q 202: Marital status of respondent
O 1: Never married
O 2: Married no children
O 3: Married with children
O 4: Divorced/ separated
O 5: Widowed
O 6: Other

Q 204: Education level of respondent
O 1: Illiterate
O 2: Can read and write
O 3: Completed primary education
O 4: Completed secondary education
O 5: Completed college education and above

Q 205: How can HIV be prevented?
O 1: Never heard of HIV
O 2: Non-response/ refuse to answer
O 3: Abstain from sex
O 4: Be faithful to spouse/regular sexual partner
O 5: Correct and consistent condom use
O 6: Treat STI's
O 7: Using antiretroviral treatment to prevent mother to child transmission
O 8: Use only tested blood/ blood products
O 9: Do not share sharps/blades/cutting instruments
O 10: There is nothing to do to protect yourself
O 11: Don't know
O 12: Other

Q 207: How can a person get HIV?
O 1: Unprotected sex with an HIV+ person
O 2: Infected blood
O 3: HIV+ mother to child
O 4: Infected sharp instruments (needle, syringe)
O 5: Don't know
O 6: Other
O 7: Non-response

Q 209: Where do you hear information about HIV from?
O 1: Never heard of HIV
O 2: CHE's / Peer educators
O 3: Clinic
O 4: VCT
O 5: Friends
O 6: Family
O 7: Radio
O 8: School
O 9: Church
O 10: Other
O 11: Non-response

Q 211: If you knew a shop keeper was HIV positive, would you buy food from him / her
O 1: Yes
O 2: No
O 3: Don't Know

Q 212: What is a condom used for?
O 1: To prevent HIV / STI's
O 2: To prevent pregnancy
O 3: Don't know
O 4: Other

Q 214: What would you do if you think you have an STI?
O 1: Go to clinic
O 2: Go to traditional healer
O 3: Use local herbs at home
O 4: Buy drugs in the market
O 5: Notify my sexual partner (s)
O 6: Nothing
O 7: Don't know
O 8: Other

Q 216: Do you know where to go for VCT?
O 1: Never heard of VCT
O 2: Govt clinic/health centre
O 3: Private clinic
O 4: NGO
O 5: Other
O 6: Don't know
O 7: Non-response

Q 218: Record any other relevant information that is not in the survey.

Appendix 4: Anthropometric results according to NCHS Reference 1977

Table 41: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex (NCHS, 1977)

	All n = 405	**Boys** n = 206	**Girls** n = 199
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(82) 20.2 % (16.3 - 24.9 95% C.I.)	(43) 20.9 % (16.0 - 26.7 95% C.I.)	(39) 19.6 % (14.1 - 26.6 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(80) 19.8 % (15.8 - 24.4 95% C.I.)	(43) 20.9 % (16.0 - 26.7 95% C.I.)	(37) 18.6 % (13.3 - 25.3 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(2) 0.5 % (0.1 - 2.0 95% C.I.)	(0) 0.0 % (0.0 - 0.0 95% C.I.)	(2) 1.0 % (0.2 - 4.1 95% C.I.)

The prevalence of oedema is 0.0%

Figure 41: Frequency distribution of weight for height z-scores (NCHS, 1977)

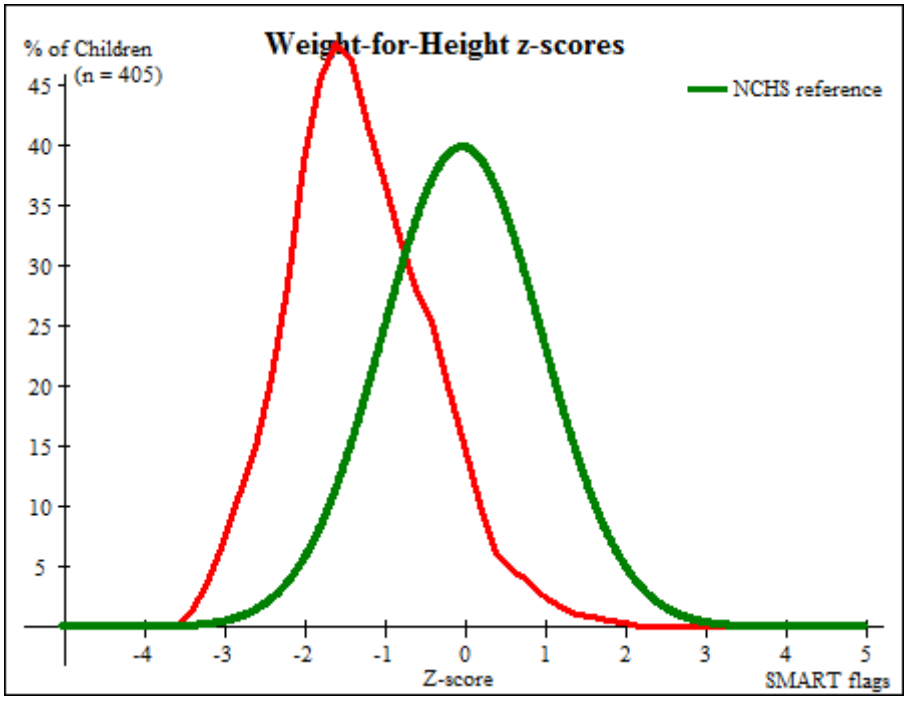


Table 42: Prevalence of acute malnutrition by age based on weight-for-height z-scores and/or oedema (NCHS, 1977)

		Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Age (months)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	103	2	1.9	18	17.5	83	80.6	0	0.0
18-29	98	0	0.0	28	28.6	70	71.4	0	0.0
30-41	75	0	0.0	10	13.3	65	86.7	0	0.0
42-53	92	0	0.0	17	18.5	75	81.5	0	0.0
54-59	37	0	0.0	7	18.9	30	81.1	0	0.0
Total	405	2	0.5	80	19.8	323	79.8	0	0.0

Table 43: Distribution of acute malnutrition and oedema based on weight-for-height z-scores (NCHS, 1977)

	<-3 z-score	**>=-3 z-score**
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 2 (0.5 %)	Not severely malnourished No. 404 (99.5 %)

Table 44: Prevalence of acute malnutrition based on MUAC cut off's (and/or oedema) and by sex (NCHS, 1977)

	All n = 409	**Boys** n = 208	**Girls** n = 201
Prevalence of global malnutrition (< 125 mm and/or oedema)	(37) 9.0 % (6.5 - 12.5 95% C.I.)	(14) 6.7 % (4.3 - 10.4 95% C.I.)	(23) 11.4 % (7.3 - 17.5 95% C.I.)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	(33) 8.1 % (5.6 - 11.5 95% C.I.)	(13) 6.3 % (3.9 - 9.9 95% C.I.)	(20) 10.0 % (6.0 - 16.0 95% C.I.)
Prevalence of severe malnutrition (< 115 mm and/or oedema)	(4) 1.0 % (0.4 - 2.6 95% C.I.)	(1) 0.5 % (0.1 - 3.6 95% C.I.)	(3) 1.5 % (0.5 - 4.6 95% C.I.)

Table 45: Prevalence of acute malnutrition by age, based on MUAC cut off's and/or oedema (NCHS, 1977)

		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	104	2	1.9	16	15.4	86	82.7	0	0.0
18-29	99	1	1.0	12	12.1	86	86.9	0	0.0
30-41	76	1	1.3	1	1.3	74	97.4	0	0.0
42-53	92	0	0.0	4	4.3	88	95.7	0	0.0
54-59	38	0	0.0	0	0.0	38	100.0	0	0.0
Total	409	4	1.0	33	8.1	372	91.0	0	0.0

Table 46: Prevalence of acute malnutrition based on the percentage of the median and/or oedema (NCHS, 1977)

	n = 405
Prevalence of global acute malnutrition (<80% and/or oedema)	(45) 11.1 % (8.6 - 14.2 95% C.I.)
Prevalence of moderate acute malnutrition (<80% and >= 70%, no oedema)	(45) 11.1 % (8.6 - 14.2 95% C.I.)
Prevalence of severe acute malnutrition (<70% and/or oedema)	(0) 0.0 % (0.0 - 0.0 95% C.I.)

Table 47*:* Prevalence of malnutrition by age, based on weight-for-height percentage of the median and oedema (NCHS, 1977)

		Severe wasting (<70% median)		Moderate wasting (>=70% and <80% median)		Normal (> =80% median)		Oedema	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	103	0	0.0	8	7.8	95	92.2	0	0.0
18-29	98	0	0.0	17	17.3	81	82.7	0	0.0
30-41	75	0	0.0	5	6.7	70	93.3	0	0.0
42-53	92	0	0.0	11	12.0	81	88.0	0	0.0
54-59	37	0	0.0	4	10.8	33	89.2	0	0.0
Total	405	0	0.0	45	11.1	360	88.9	0	0.0

Table 48: Prevalence of underweight based on weight-for-age z-scores by sex (NCHS, 1977)

	All n = 405	**Boys** n = 205	**Girls** n = 200
Prevalence of underweight (<-2 z-score)	(142) 35.1 % (29.5 - 41.1 95% C.I.)	(84) 41.0 % (32.8 - 49.7 95% C.I.)	(58) 29.0 % (22.0 - 37.2 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(120) 29.6 % (24.7 - 35.1 95% C.I.)	(73) 35.6 % (27.8 - 44.2 95% C.I.)	(47) 23.5 % (17.9 - 30.2 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(22) 5.4 % (3.3 - 8.7 95% C.I.)	(11) 5.4 % (2.7 - 10.4 95% C.I.)	(11) 5.5 % (2.8 - 10.7 95% C.I.)

Table 49: Prevalence of underweight by age, based on weight-for-age z-scores (NCHS, 1977)

		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	102	7	6.9	29	28.4	66	64.7	0	0.0
18-29	98	11	11.2	45	45.9	42	42.9	0	0.0
30-41	75	0	0.0	18	24.0	57	76.0	0	0.0
42-53	92	2	2.2	22	23.9	68	73.9	0	0.0
54-59	38	2	5.3	6	15.8	30	78.9	0	0.0
Total	405	22	5.4	120	29.6	263	64.9	0	0.0

Figure 42: Frequency distribution of weight for age z-scores (NCHS, 1977)

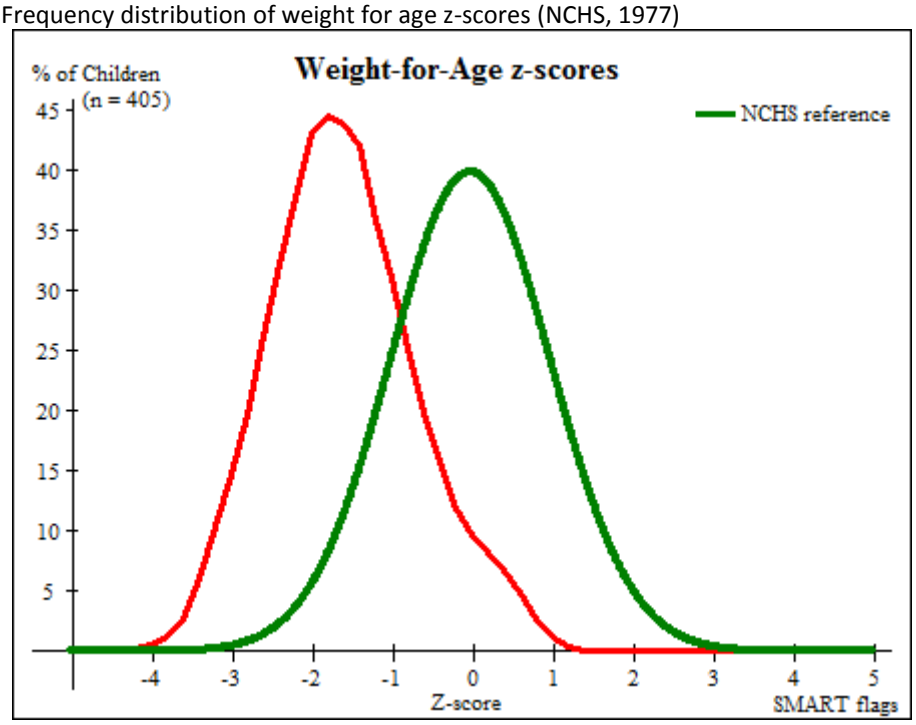


Table 50: Prevalence of stunting based on height-for-age z-scores and by sex (NCHS, 1977)

	All n = 399	**Boys** n = 204	**Girls** n = 195
Prevalence of stunting (<-2 z-score)	(51) 12.8 % (9.4 - 17.2 95% C.I.)	(34) 16.7 % (11.2 - 24.1 95% C.I.)	(17) 8.7 % (5.2 - 14.3 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(41) 10.3 % (7.0 - 14.8 95% C.I.)	(27) 13.2 % (8.0 - 21.2 95% C.I.)	(14) 7.2 % (4.3 - 11.8 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(10) 2.5 % (1.4 - 4.3 95% C.I.)	(7) 3.4 % (1.7 - 6.9 95% C.I.)	(3) 1.5 % (0.5 - 4.6 95% C.I.)

Figure 43: Frequency distribution of height for age z-scores (NCHS, 1977)

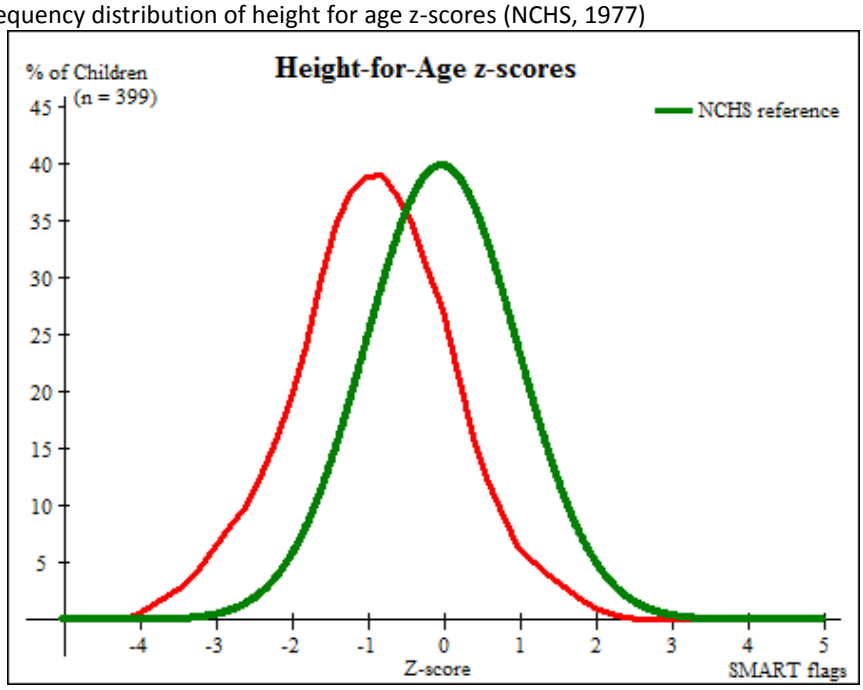


Table 51: Prevalence of stunting by age based on height-for-age z-scores (NCHS, 1977)

		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	99	3	3.0	14	14.1	82	82.8
18-29	98	4	4.1	18	18.4	76	77.6
30-41	74	0	0.0	4	5.4	70	94.6
42-53	91	2	2.2	5	5.5	84	92.3
54-59	37	1	2.7	0	0.0	36	97.3
Total	399	10	2.5	41	10.3	348	87.2

Table 52: Mean z-scores, Design Effects and excluded subjects (NCHS, 1977)

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	405	-1.29±0.86	1.14	3	1
Weight-for-Age	405	-1.60±0.90	1.47	2	2
Height-for-Age	399	-0.91±1.02	1.32	0	10

* contains for WHZ and WAZ the children with oedema.

Appendix 5: SMART Plausibility Report for the Abyei February 2015 data

Overall data quality

Criteria	Flags*	Unit	Excel.	Good	Accept	Problematic	**Score**
Missing/Flagged data	Incl	%	0-2.5	>2.5-5.0	>5.0-7.5	>7.5	
(% of in-range subjects)			0	5	10	20	**0** (0.7 %)
Overall Sex ratio	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**0** (p=0.729)
Overall Age distrib	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**0** (p=0.366)
Dig pref score - weight	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (5)
Dig pref score - height	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**2** (8)
Dig pref score - MUAC	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (5)
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	2	6	20	**0** (0.98)
Skewness WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**0** (0.12)
Kurtosis WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**1** (-0.25)
Poisson dist WHZ-2	Excl	p	>0.05	>0.01	>0.001	<=0.001	
			0	1	3	5	**0** (p=0.487)
Timing	Excl	Not determined yet					
			0	1	3	5	
OVERALL SCORE WHZ =			0-9	10-14	15-24	>25	**3** %

The overall score of this survey is 3 %, this is excellent.