NUTRITIONAL ANTHROPOMETRIC AND MORTALITY SURVEY

FINAL REPORT

WAJIR EAST AND SOUTH DISTRICT

NORTH EASTERN PROVINCE, KENYA

25TH MAY TO 3RD JUNE 2013

Caroline Njeri Kimere

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Acronyms

ALDEF	-	Arid Lands Development Focus
APHIA	-	Aids Population Health Integrated Assistance Project
ASAL	-	Arid and Semi-Arid Lands
CDR	-	Crude Death Rate
CI	-	Confidence Interval
CMR	-	Crude Mortality Rate
CSB	-	Corn Soya Blend
ENA	-	Emergency Nutrition Assessment
EPI	-	Extended Programme of Immunization
GAM	-	Global Acute Malnutrition
GFD	-	General Food Distribution
HAZ	-	Height-for-Age Z-score
HINI		High Impact Nutrition Interventions
HSNP	-	Hunger Safety Net Project
KFSSG	-	Kenya Food Security Steering Group
L/HAZ	-	Length/ Height for Age –Z-score
MOH	-	Ministry of Health
MUAC	-	Mid-Upper Arm Circumference
NDMA	-	National Drought Management Authority
OFDA	-	US Office for Foreign Disaster Assistance
OPV	-	Oral Polio Vaccine
OTP	-	Out-patient Therapeutic Program
SAM	-	Severe Acute Malnutrition
SC	-	Stabilization Centre
SD	-	Standard Deviation
SFP	-	Supplementary Feeding Programme
SMART	-	Standardized Monitoring and Assessment of Relief and Transitions
U5MR	-	Under Five-Mortality Rate
UNICEF	-	United Nations Children's Fund
URTI	-	Upper Respiratory Tract Infection
WAZ	-	Weight-for-Age Z-score
WFP	-	World Food Programme
WHM	-	Weight for Height Median
WHO	-	World Health Organization
WHZ	-	Weight-for-Height/length Z-scores

Executive summary

Wajir East and Wajir South districts are two of the 4 districts within the larger Wajir County. The two districts comprise of 11 administrative divisions namely Wajir Bor, Tarbaj, Kutulo, Central, Mansa and Khorofharar in Wajir East district and Habaswein, Sabuli, Banane, Diif and Kulaaley divisions in Wajir South district. The districts lie around 3° north of the Equator and border Somalia to the East, Lagdera to the South, Wajir West to the West, Wajir North to the North West and Mandera Central District to the North. Wajir East and South districts, measuring approximately 38,471 km² (Wajir East -14,471 km² and Wajir South-24,000km²), are gazetted as Arid and Semi-Arid Lands (ASAL) of Kenya. Wajir town is the county headquarters and is the largest urban town in Wajir County. The two districts' population is currently estimated at 364,097[1] persons.

The main livelihood activity in the two districts is pastoralism and being predominantly arid, the district experiences chronic food insecurity and high incidences of malnutrition. Predictable rainy and dry seasons can no longer be counted upon to provide adequate dry season grazing and water for pastoral populations, whose resilience is increasingly eroded by broader economic factors in the region. Food aid continues to be a key source of food for a majority of the population.

Save the Children has been present in Wajir East and South since 2009 with interventions in nutrition (treatment of the acutely malnourished, nutrition surveillance and promotion of infant and young child feeding), health (capacity building and health systems strengthening for maternal and child health), Water, Hygiene and Sanitation (WASH) and food security and livelihoods. Save the Children in collaboration with the Ministry of Health and on behalf of the district steering group undertakes annual nutrition surveys (before the long rains) to monitor the nutrition situation. This survey was undertaken in May to evaluate the nutrition status of the population as well to double as ongoing nutrition surveillance.

Survey objectives

The specific objectives of this survey were to estimate:

1. The prevalence of acute and chronic malnutrition in children aged 6-59 months;
2. The nutrition status pregnant women and mothers with children <5 years;
3. The proportion of households with access to improved water and sanitation;
4. Infant and young child feeding (IYCF) practices;
5. The coverage and content of the general food distribution;
6. The food access and dietary diversity at household level;
7. The Coverage of measles and BCG vaccination among target children;
8. The Coverage rate of Vitamin A. supplementation and de worming;
9. The Morbidity rates of children 6-59 months 2 weeks prior to the survey;
10. To recommend appropriate interventions based on the survey findings;

[1] Figures from the District Development Office

Area covered

The survey was conducted from 25th May to 3rd June 2013 and covered the 11 administrative divisions, 6 in Wajir East District namely: Central, Wajir Bor, Kotulo, Khorofharar, Mansa and Tarbaj and 5 in Wajir South namely Habswein, Sabuli, Banane, Diif and Kulaaley

Methodology

A multi stage cluster sampling method was applied. Emergency Nutrition Assessment (ENA) for Standardized Monitoring of Relief and Transition (SMART) was used to calculate sample size for Anthropometry and mortality samples while Infant and Young Child Feeding (IYCF) multi survey sampling calculator provided in the survey guidelines was used to calculate sample size for IYCF.

Probability Proportional to population Size (PPS) was used to identify clusters within a study area after collecting population data from all villages that were considered as clusters. In the second stage of sampling (selection of households), simple random sampling was done where complete household lists were made with the help of the chiefs and village elders from which thirteen households were selected.

The target population for the anthropometric survey was children aged 6-59 months while that for IYCF was children 0-<24 months. The total sample size of households was arrived at by collating both the Anthropometry, IYCF and Mortality samples. The final sample size was 405 households from 33 clusters.

Data was collected on anthropometry, morbidity, vaccination and de-worming status, Vitamin A supplementation, hygiene and sanitation practices, IYCF, food security and livelihoods. This data was triangulated with feeding programme data to help in the interpretation of results.

Anthropometric data were analyzed using the ENA for SMART software beta version May 2011. IYCF data was analyzed on Excel and Qualitative and quantitative data was analysed using the SPSS software version 17.

Main survey results

Table 1: Results Summary

Characteristic	**% (95% CI)**
GAM (WFH <-2 Z score or presence of oedema) - WHO 2006	10.5% (7.9 – 13.9 95% CI)
SAM (WFH <-3 Z score or presence of oedema) - WHO 2006	1.6% (0.8 – 3.1 95% CI)
Prevalence of GAM by MUAC (<12.5cm)	3.6 % (2.1 - 5.9 95% C.I.)
Proportion of children sick two weeks prior to survey	43.8%
Proportion of caretakers seeking medical care when child is ill	84.9%
BCG Scar present	94%
Measles immunization (by card and confirmation)	89.9%
OPV1 immunization (by card and confirmation)	97.6%

OPV3 immunization (by card and confirmation)	93.5%
Vitamin A supplementation coverage ≥12 month) -1 time	34.4%
Vitamin A supplementation coverage (≥12 month) -2 times	53.6%
Vitamin A supplementation coverage (6-11 months)- 1 time	72.3%
Proportion of children >1 year de-wormed 1 time	30.4%
Proportion of children >1 year de-wormed 2 times	32.2%
Iron-folate Supplementation for pregnant mothers	46.7%
Appropriate hand-washing with soap/ash	65.4%
Proportion of children 6-59 months supplemented with Zinc the last time they had diarrhoea	30%
IYCF Key Indicator - Timely Breast-feeding Initiation	87.6%
IYCF Key Indicator - Exclusive Breastfeeding	66.8%
IYCF Key Indicator - Minimum Dietary Diversity->3 times BF Minimum Dietary Diversity->4 times NBF	35.3% 34.6%
IYCF Key Indicator Minimum Feeding Frequency->2 times 6-8 MTS BF Minimum Feeding Frequency->3 times 9-23 MTS BF Minimum Feeding Frequency->4times 6-23 MTS NBF	39.2% 58% 46.2%

Recommendations

Issues	Possible causes	Recommendations	By who
Low water treatment	-difficult to measure the shallow wells capacities. -Taste of aqua tabs not appealing. -community perception of aqua tabs as drugs	-Using stock solution(Treatment of water in known capacities i.e 20L Jerry-can) instead of crude chlorination -Hygiene education on water treatment	MOH with support from partners

Low Vit A & deworming coverage compared to national target	-Training gap for the HWs on Growth monitoring. -poor health education and counseling by the HFs in charges.	-strengthen growth monitoring -linking ECDs/Duksis and health facilities -Use of Monitor charts for the health facilities. -Health education when supplementing. -HFs to ensure accurate documentation on the CWCs cards	MOH with support from partners
Low complementary feeding interventions	-low community understanding on appropriate complementary foods. -under-developed markets	-More focus to be put on complementary feeding when giving HE -Utilize the WBW to sensitize divisions on CF --Provision of demonstration kits/food guide pyramids for the facilities/Outreach sites. -Support groups establish more kitchen gardens coupled with cooking demonstrations. -awareness creation and Health education through local media.	MOH supported by partners
Low toilet coverage	-low latrine construction by the communities. -Community belief on use of a common toilet for the family i.e parents vs children	-more emphasize to use of CLTS approach in sensitizing the communities. -Explore through future KPC surveys on the beliefs and from this come up with appropriate recommendations. -Need to explore Child Health and Sanitation Trainings(CHAST) in school health clubs.	MOH with support partners.
Poor Health education	-No structure Health education sessions in the HFs. -Unavailability of health education reporting tools.	-More focus on structured Health education sessions in the health facilities. -Need to come up with Health Education reporting tools and inclusion of the component in the DHIS	DHMTs and partners during supervision capacity working group.

Low Iron-folate supplementation	-Insufficient counseling to mothers during ANC visits.	-Counseling of mothers on importance of iron-folate supplements	DHMTs
Low ITNS treatment	Use of LLITNs previously given through partners/MOH	-Demonstrations on ITNs treatment during health education and promotion activities.	MOH

1. Introduction

Background

The larger Wajir East and South districts are located in the recently formed Wajir County, one of the 3 counties in North Eastern Kenya. The districts are located in the North West horn of Kenya bordered by Somalia republic to the east, Wajir West to the West, Lagdera to the south and Mandera South and West to the North. The 2 districts are further subdivided into Wajir East and Tarbaj districts which make up the larger Wajir East district and Habaswein and Wajir South districts which make up the larger Wajir South district with the towns of Wajir, Tarbaj, Habaswein and Leheley being the district headquarters respectively. Wajir town is also privileged to be the county headquarters. Wajir East and Tarbaj Districts administratively comprise of 6 divisions namely Wajir Bor, Khorof Harar, Kotulo, Mansa, Sarman and Central divisions while Habaswein and Wajir South districts administratively consist of 5 divisions namely Habaswein, Sabuli, Banane, Diif and Kulaaley divisions.

The population in the two larger districts is predominantly Muslim and of Somali ethnicity, and is divided into clans, with community elders being in charge of daily affairs. Degodia clan is predominant in Wajir East and Tarbaj districts with Matan, Geylible, Fai, Fardanow and Jibrail sub-clans while Ogaden in the predominant clan in Habswein and Wajir South districts with Gare (GK), Bah Gere,(BG) Muhamed Zuera (MZ) and Makabul (MK) sub-clans..

Within the 11 divisions there are a total of 42 Ministry of Health (MOH) health facilities including Wajir and Habaswein district hospitals and 2 nomadic dispensaries.

Save the Children has since October 2012 through ECHO and DFID funding been offering technical, Logistical and financial support to MOH to carry out 11 High Impact Nutrition Interventions (HINI) components in the districts. The 11 HINI components are: Integrated Management of acute malnutrition (IMAM), promotion of Exclusive breastfeeding up to 6 months, Optimal complementary feeding at six months, twice yearly supplementation of Vitamin A, Deworming, micronutrient powder supplementation, Zinc supplementation in diarrhoea management, Iron folate supplementation in pregnancy, salt iodization, growth monitoring and Hand-washing. Currently in the 2 larger districts, 37 health facilities and 39 outreaches sites are being supported to implement HINI.
Additionally, Save the Children through the US Office for Foreign Disaster Assistance (OFDA) funding has been issuing milk vouchers to moderately malnourished beneficiaries. Each child was receiving 300ml of milk per day for a period of 6 months from November 2012 to May 2013.

The survey area covered all eleven divisions of the two districts (Fig 1). The current estimated population living in these areas is 364,097(226,086[2] in Wajir East and137,991[3] in Wajir South)

Figure 1:Map of Wajir South District

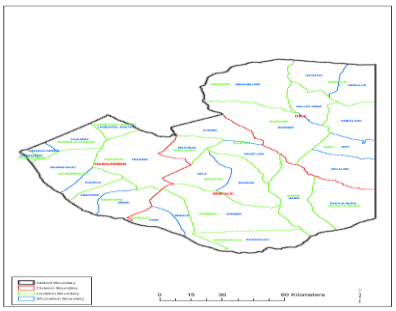
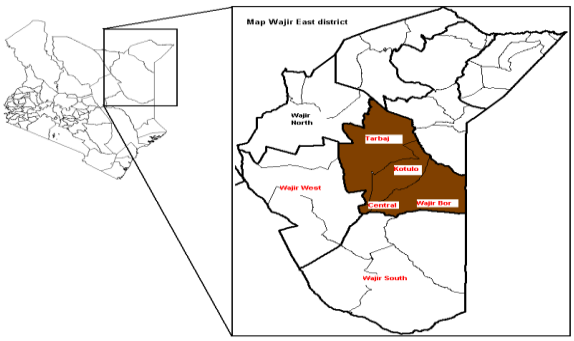


Figure 2: Map of Wajir East district



1.1 Geography

Wajir East and South Districts are featureless plain, which is prone to flooding during the rainy season. The districts have some seasonal swamps and perennial river beds/drainage lines ('laghas') that flow in the rainy season. These serve as dry season grazing zones and also allow some cultivation when it rains. The area receives bimodal rains with the onset of the long rains in April. The months succeeding the long rains, June to September, are very dry but vegetation continues to thrive because the lower temperatures reduce the rate of evaporation. The short rains fall from September/October to December. The average annual rainfall is 250-300mm and quantitatively, it rains more during the short rains than during the long rains[4]. However the rains have become increasingly unpredictable and erratic.

The topography of the two districts is a slightly elevated plateau, which lies between 150-200m above sea level. The mean annual temperature of the districts is 29°C and ranges from 28°-39°C. The districts lie within the sahelian climatic region, which is characterized by long dry spells and short rainy seasons. In the classification of areas by aridity, the district is categorized as Zone VII (i.e. 100% Arid with cyclic droughts). Soils are mainly sandy and sandy loams.

1.2. Livelihoods

About 60% -70% of the people depend largely on livestock for their livelihood. The main form of land use is nomadic pastoralism which is seen as the most efficient method of exploiting the range lands hence pastoral activities are practiced all over the district

Current Climatic Conditions and Food Security

Persistent incidences of drought and their increasing unpredictability in the province in

[2] Current Estimates from DDO's Office- Wajir Town based on 2009 census
[3] Current estimates from DDO's Office Habaswein based on 2009 census
[4] District Development Office- Summary document for Key Investment Opportunities in Wajir East District

recent years have continued to threaten the livelihoods of many pastoralists subjecting them to food insecurity (due to the short recovery phase between droughts), high malnutrition rates (above the emergency thresholds of 15%) and increased disease burden. In 2011, the districts, including the rest of the ASALS suffered severe drought conditions, which further eroded the already diminishing livelihoods causing critical food insecurity, lack of water and high malnutrition rates.

Figure 2: Seasonal Timeline

Short Dry Spell (Jilaal)			**Long Rainy Reason (Gu')**			**Long Dry Spell (Hagai)**				**Short Rainy Season (Deyr)**	
Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Migration, Conflicts, Watering of Livestock, Pressure on boreholes			Pasture Surveys, mating season, Planting			Livestock diseases, Labour Demand			Calving, Kidding Period	Migration, Conflict	

The most recent nutrition surveys conducted in October 2012 showed Global Acute Malnutrition (GAM) rates of 16.9% in Wajir East and 15,8% in Wajir South.

In addition to the poor food insecurity at household level, the continued high levels of malnutrition have been precipitated by a number of factors including: Very poor Infant and young child feeding practices in the region (low exclusive breastfeeding rates, late introduction of complementary feeds), Poor dietary diversity, a lack of adequate water together with poor sanitation and hygiene conditions and high illiteracy (78.4% for women)[5], and cultural practices which have a negative effect on the uptake of health and nutrition services.

The districts recently received some good long rains between March-April 2013, which in turn have seen increased admissions of malnourished cases with medical complications (mainly due to diarrhoea, vomiting, malaria and Pneumonia) to the inpatient wards typical of the rainy seasons.

Humanitarian interventions in Wajir East district

Save the Children has been implementing programmes in Wajir East and South districts since August 2009. Currently, Save the Children has adopted the national nutrition strategy which applies the High Impact Nutrition Interventions (HINI) approach in dealing with malnutrition with support (logistical and Human resource) being provided to the MOH to accelerate provision of the package in the two districts. Other programs supported by Save The Children in the districts include Health (Safe motherhood,

[5] Kenya Demographic Health Survey 2008-2009

Community Health Strategy), Education, Child protection and Food security and Livelihoods Support programmes. All these programs aim to address the underlying causes of malnutrition through strengthening health systems, treatment for acute malnutrition and enhancement of house hold food security and livelihoods in the medium term while at the same time linking these to long term livelihood strategies.

The World Food Programme (WFP) through Arid Lands Development Focus (ALDEF) has been carrying out General Food Distribution (GFD) in this area. The GFD food basket provides a 75% ration scale of 2,100Kcal/person, the daily per capita energy requirement[6] and is as follows:

Table 2: WFP Food Basket Commodities

Commodity	Ration Sizes
Cereals	10.35kg
Pulses	1.80 kg
Corn Soya Blend (CSB)	1.20 kg
Vegetable Oil	0.60 kg

The Ministry of special programmes through the District Commissioner's office occasionally supplies food to the region and this is usually divided equally among the divisions. A school feeding programme is also available in all government schools run by WFP.

Other actors on the ground include:
OXFAM GB supporting ALDEF and WASDA administratively to implement livelihoods and water and sanitation programmes.
Kenya Red Cross society undertaking emergency relief operations
APHIA plus Integrated Marginal Arid Regions Innovative Social health Approach(IMARISHA): This is a consortium of NGOs funded by USAID to support improved service delivery in the areas of HIV /AIDS, malaria, family planning, maternal New-born and Child Health, and in matters related to reproductive health and support livelihoods activities in the county
ADESO undertaking cash relief and cash for work

1.5 Survey Objectives

The survey was undertaken from 25th May to 3rd June 2013 with MOH taking a leadership role supported by Save the Children. This survey aimed to provide information on the nutrition status in Wajir District as part of ongoing nutrition surveillance.

The specific objectives of this survey were to estimate:

- The prevalence of acute and chronic malnutrition in children aged 6-59 months;
- The nutrition status pregnant women and mothers with children <5 years ;

[6] Based on UNHCR/UNICEF/WFP/WHO Guidelines for Food and Nutrition Needs in Emergencies

- The proportion of households with access to improved water and sanitation;
- Infant and young child feeding practices
- The coverage and content of the general food distribution;
- The food access and dietary diversity at household level;
- The Coverage of measles and BCG vaccination among target children;
- The Coverage rate of Vitamin A supplementation, de worming, zinc supplementation and iron folate supplementation;
- The Morbidity rates of children 6-59 months 2 weeks prior to the survey;
- To recommend appropriate interventions based on the survey findings;

2. Methodology

2.1 Sample size

The malnutrition/anthropometric sample size was based on the following parameters:

Table 3: Sampling parameters

Data entered on ENA software	Anthropometric values	Rationale
Estimated prevalence	16.6%	SMART survey 2012 16.6% (13.4-20.3 95% CI)
Desired precision	4%	Based on anticipated prevalence and comparison with previous results
Design effect	1.35	2012 SMART Survey.
Average household size	6	2012 SMART Survey
% of under five children	29.6%	2012 SMART Survey
% of non-respondent	3	Anticipated non-response
Households to be included	**315**	
Children to be included	489	

2.2.2. Sample size calculation IYCF

For the IYCF sample size, as is indicated in the survey guidelines[7], four indicators namely Exclusive breastfeeding, timely initiation of breastfeeding, minimum dietary diversity and minimum meal frequency were used in the calculation of the sample size as shown in the table below.

Table 4: sample size calculation

Indicator	Estimated prevalence	desired precision	Design effect	Sample size in no of children	Average household size	% children under 5	% non-response households	Households to be included
Exclusive breastfeeding	66.9	8	1.35	195	All children to be included in the survey			
Timely initiation	81.9	8	1.35	131	6	29.6	3	190

[7] Kenya Nutrition Survey Guidelines Final Version

of breastfeeding								
Minimum dietary diversity	13.8	8	1.35	105	6	29.6	3	203
Minimum meal frequency	50.5	8	1.35	221	6	29.6	3	426

From the figures above, an additional 195 children were included in the survey for the exclusive breastfeeding indicator. It was determined that 33 clusters would be covered for the survey hence the children were equally distributed per cluster giving rise to 6 children 0-5 months per cluster. These children were sought in the houses where anthropometry was undertaken; however, in cases where enough sample was not obtained at the end anthropometry, in the selected households, they were sought purposively. On the other IYCF indicators, since the minimum meal frequency had the highest number of children 0-23 sampled (221), this number was considered and translated to having 7 children 0-23 months per cluster. Comparing the number of HH from the IYCN and anthropometry, the IYCF number was higher and therefore this number of HH was considered.

Using the above parameters, the final sample size for both anthropometry and IYCF was arrived at as shown in the table below;

Estimated Prevalence	Precision	Design Effect	% of Non-Response	Sample Size (Children to be Included)	HH based on anthropometry (proportion U5 in population 29.6%)	HH based on IYCF sample (considered)	No. of HH per day	Number of Clusters
16.6%	5%	1.35	3%	313	202	426	13	33

2.2 Sampling procedure: selecting of Households

The second sampling stage comprised of the household selection. Only the randomly sampled villages were assessed during data collection. In the selected village, Simple random sampling was used in the selection of Households. To do this a complete household (HH) list was made by the team with the help of the chiefs, the village elders and the Community Health Workers (CHWs). Then the HHs were assigned numbers which were randomly picked until the sample size of 13 households was reached.

A household was defined as a group of people who lived together and shared a common

cooking pot. In polygamous families with several structures within the same compound but with different wives having their own cooking pots, the structures were considered as separate households and assessed separately. All children aged 6-59months in every household visited were included in the anthropometric survey and 0-24 month category included in IYCF survey. In cases where there was no eligible child, a household was still considered part of the sample and all the other HH data was collected. If a respondent was absent during the time of household visit, the teams left a message and re-visited later to collect data for the missing person, with no substitution of households allowed. The teams visited the nearest adjacent village (not among those sampled) to make up for the required number of households if the selected village yielded less than 13 HHs, following the SMART methodology[8].

2.2.1. Case definitions and inclusion criteria

2.2.1.1. Anthropometric data:

Age: the age of the child was recorded based on a combination child health cards, the mothers'/caretakers' knowledge of the birth date and use of a calendar of events for the district developed in collaboration with the survey team.

Sex: it was recorded whether a child was male or female.

Bilateral oedema: normal thumb pressure was applied on the top part of both feet for 3 seconds. If pitting occurred on both feet upon release of the fingers, nutritional oedema was indicated.

Weight: the weights of children were taken with minimal or light clothing on, using UNICEF Salter Scales with a threshold of 25kgs and recorded to the nearest 0.1kg.

Length/height: children were measured bareheaded and barefooted using wooden UNICEF height boards with a precision of 0.1cm. Children under the age of two years were measured while lying down (length) and those over two years while standing upright (height). If child age could not be accurately determined, proxy heights were used to determine cases where height would be taken in a supine position (<87cm) or in an upright position (≥87cm). Height rods with a marking at 87cm were used to assist in determining measuring position.

Mid Upper Arm Circumference (MUAC): the MUAC of children was taken at the midpoint of the upper left arm using a MUAC tape and recorded to the nearest 0.1cm.

2.2.1.2. Retrospective morbidity of children:

The caretaker with the child at the time of the survey was asked to recall if the child had any illness in the 2-weeks prior to the survey.

2.2.1.3. Vaccination status and coverage:

For all children 6-59 months, information on Penta valent 1 and Oral polio Vaccine (OPV) 1 and Penta valent 3 and OPV 3 and measles vaccination was collected using health cards and recall from caregivers. The vaccination coverage was calculated as the proportion of children immunized based on records and recall.

[8]SMART (2006): Measuring Mortality, Nutritional Status and Food Security in Crises Situations: SMART METHODOLOGY

BCG: For all children 6-59 months, the information was collected by checking whether the characteristic BCG scar was present or not.
Vitamin A supplementation status: For all children 6-59 months of age, information on Vitamin A supplementation was collected using the child welfare cards and recall from caregivers. Information on how many times the child had received supplementation in the last 6 months was collected. Vitamin A capsules were also shown to the mothers to aid in recall.
De-worming status: Information was solicited from the care takers as to whether their child/children 6-59 months had been de-wormed in the last 3 months. A local calendar of events was used to refer to 3 months recall period.

2.2.1.4. Infant and Young Child feeding (IYCF)

Data on IYCF was collected from children aged 0-<24 months and was based on mothers recall of feeding practices including a 24 hour dietary recall.

2.2.4. Nutritional Status Cut-off Points

The following nutritional indices and cut-off points were used in this survey:

2.2.4.1. Weight-for-height (WFH) and MUAC – Wasting among Children

The prevalence of wasting (a reflection of the current health/nutritional status of an individual) are presented as Global Acute Malnutrition (GAM) and Severe Acute Malnutrition (SAM) using weight-for-height (WFH) z-scores and MUAC indices. The results on wasting were presented as global acute malnutrition (GAM) and severe acute malnutrition (SAM):

- Children whose WFH z-scores fell below -2 standard deviations from the median of the WHO standards (WHO-GS) or had bilateral oedema were classified as wasted (to reflect GAM)
- Children whose WFH z-scores fell below -3 standard deviations from the median of the WHO-GS or had bilateral oedema were classified as severely wasted (to reflect SAM)

Like weight for height, MUAC is used to quantify wasting in a population.
The guidelines used are as follows:
MUAC <11.5 cm - severe acute malnutrition and high risk of mortality
MUAC ≥11.5 cm and <12.5cm - moderate acute malnutrition and moderate risk of mortality
MUAC≥12.5 cm and <13.5 cm - high risk of malnutrition
MUAC≥13.5 cm - adequate nutritional status
A cut-off point of <12.5cm MUAC was used to denote GAM among the underfives.

2.2.4.2. Weight-for-age (WFA) – Underweight

The measure of underweight gives a mixed reflection of both the current and past nutritional experience by a population and is a very useful tool in growth monitoring.

- Children whose WFA z-scores fell below -2 standard deviations from the median of the WHO-GS or had bilateral oedema were classified as underweight
- Children whose WFA z-scores fell below -3 standard deviations from the median of the WHO-GS or had bilateral oedema were classified as severely underweight.

2.2.4.3. Height-for-age (HFA) – Stunting

Height-for-age is a measure of linear growth and therefore an unequivocal reflection of the cumulative effects of past nutritional inadequacy and/or illness episodes.

- Children whose HFA z-scores fell below -2 standard deviations from the median of the WHO-GS were classified as stunted (to reflect Global Stunting)
- Children whose HFA z-scores fell below -3 standard deviations from the median of the WHO-GS were classified as severely stunted.

2.2.6. Questionnaire, training and supervision

2.2.6.1. Questionnaire

The standard nutrition survey questionnaire as recommended in the nutrition guidelines[8] was adapted to include additional information on the high Impact nutrition interventions. The IYCF questionnaire as recommended in the CARE IYCF step by step guide was used to collect information on IYCF.

The questionnaire was developed in English and the enumerators trained on the questionnaire. During the training session, the enumerators translated the questionnaires as they would ask during data collection and an agreed way of asking the questions during data collection was agreed upon. The questionnaires were not translated into Somali language however, all interviews were conducted in Somali language. The questionnaire was pre-tested a day before the actual survey began and the final questionnaire used is annexed in the report.

2.2.6.2. Survey teams and supervision

The survey was executed by 6 teams each comprising of 1 team leader and 2 anthropometric measurers. Four of the team leaders were from Ministry of Health (MOH, 1 from National Drought Management Authority (NDMA) and one from the District development Office.

The survey was led and supervised by trained staff from Save the Children International (SCI). The anthropometric measurers were recruited from the district and spoke the local language as well as English. The measurers were required to be literate and at least have completed high school to participate in the study. The team leaders were practitioners either in health, food security and nutrition and were sourced from the government and Save the Children. The survey was supervised by the nutrition technical specialist from Save the Children.

2.2.6.2. Training

Training for the survey teams was undertaken by Save the Children staff (the nutrition technical specialist). The training was undertaken for 3 days and covered an introduction to nutrition and nutrition assessments, the survey objectives, anthropometric measurements, household selection procedures, data collection and interviewing skills and the survey questionnaire. The anthropometric standardization exercise, as recommended by the SMART methodology was undertaken with 10 children, each

[8] Kenya Nutrition Survey Guidelines Final Version 2012

measurer taking measurements on each child twice. Each enumerator was closely observed and guided by supervisors and manually given a score of competence based on performing measurements with accuracy and precision.

After the class room training, practical field experience was conducted to pre-test the questionnaire, take anthropometric measurements of children and caretakers, conduct interviews and fill questionnaires; pre-testing exercise was performed on 12 households. The pre-testing exercise facilitated some changes on the structure of the questionnaire. In addition, a team of data clerks who were trained on the operation of ENA for SMART for the data entry and these were closely supervised by the Monitoring and Evaluation (M&E) coordinator from Save the Children.

2.2.6.3. Data analysis

Anthropometric and mortality data entry and processing was done using the ENA for SMART software Beta version May 2011 where the World Health Organization Growth Standards (WHO-GS) data cleaning and flagging procedures were used to identify outliers which enabled data cleaning as well as exclusion of discordant measurements from anthropometric analysis. The ENA for SMART software generated weight-for-height, height-for-age and weight-for-age Z scores to classify them into various nutritional status categories using WHO[9] standards and cut-off points. IYCF data was analysed in Excel using guidance from the Infant and Young Child Feeding Practices collecting and using data: a step- by- step guide. All the other quantitative data were entered and analysed in the SPSS version 17.

[9] WHO 2006

3. Results

3.1 Anthropometric results (based on WHO standards 2006):

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

Exclusion of z-scores: No exclusion

Table 5: Distribution of age and sex of sample

	Boys		Girls		Total		Ratio
AGE (mo)	**no.**	**%**	**no.**	**%**	**no.**	**%**	**Boy:girl**
6-17	47	39.5	72	60.5	119	26.6	0.7
18-29	64	52.5	58	47.5	122	27.3	1.1
30-41	44	44.0	56	56.0	100	22.4	0.8
42-53	41	49.4	42	50.6	83	18.6	1.0
54-59	12	52.2	11	47.8	23	5.1	1.1
Total	208	46.5	239	53.5	447	100.0	0.9

Figure 3.1: Population age and sex pyramid

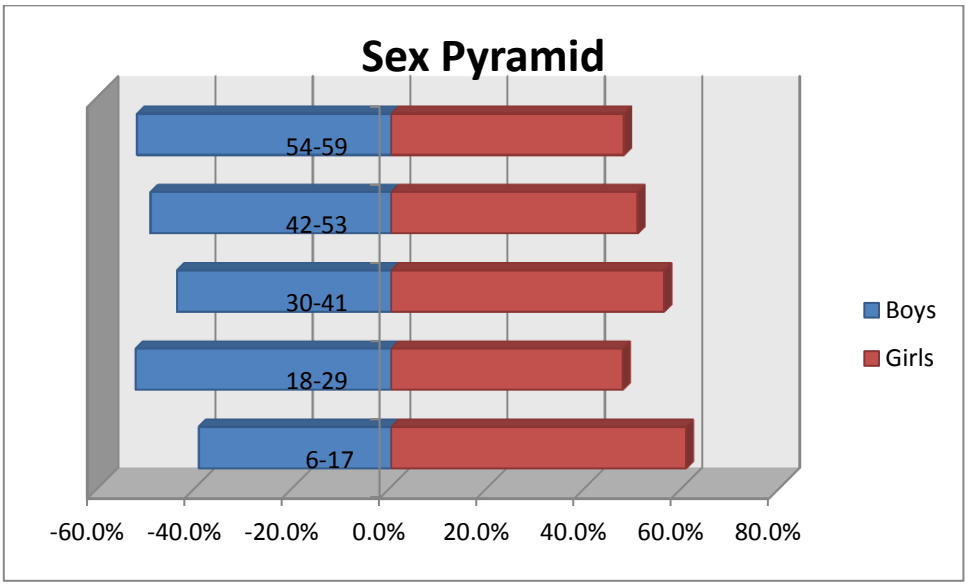


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Table 6: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

	All n = 446	**Boys** n = 208	**Girls** n = 238
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(47) 10.5 % (7.9 - 13.9 95% C.I.)	(25) 12.0 % (8.1 - 17.4 95% C.I.)	(22) 9.2 % (6.3 - 13.3 95% C.I.)

Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(40) 9.0 % (6.6 - 12.1 95% C.I.)	(20) 9.6 % (6.1 - 14.8 95% C.I.)	(20) 8.4 % (5.7 - 12.3 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(7) 1.6 % (0.8 - 3.1 95% C.I.)	(5) 2.4 % (1.1 - 5.4 95% C.I.)	(2) 0.8 % (0.2 - 3.5 95% C.I.)

The prevalence of oedema is 0.0 %

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

		Severe wasting (<-3 z-score)		**Moderate wasting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	119	2	1.7	9	7.6	108	90.8	0	0.0
18-29	122	0	0.0	10	8.2	112	91.8	0	0.0
30-41	100	2	2.0	6	6.0	92	92.0	0	0.0
42-53	83	2	2.4	11	13.3	70	84.3	0	0.0
54-59	22	1	4.5	4	18.2	17	77.3	0	0.0
Total	446	7	1.6	40	9.0	399	89.5	0	0.0

Table 8: Distribution of acute malnutrition and oedema based on weight-for-height z-scores

	<-3 z-score	**>=-3 z-score**
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 7 (1.6 %)	Not severely malnourished No. 439 (98.4 %)

Table 9:Prevalence of acute malnutrition based on MUAC cut off's (and/or oedema) and by sex

	All n = 447	**Boys** n = 208	**Girls** n = 239
Prevalence of global malnutrition (< 125 mm and/or oedema)	(16) 3.6 % (2.1 - 5.9 95% C.I.)	(4) 1.9 % (0.8 - 4.8 95% C.I.)	(12) 5.0 % (2.7 - 9.1 95% C.I.)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	(13) 2.9 % (1.6 - 5.1 95% C.I.)	(2) 1.0 % (0.2 - 3.7 95% C.I.)	(11) 4.6 % (2.4 - 8.6 95% C.I.)
Prevalence of severe malnutrition	(3) 0.7 %	(2) 1.0 %	(1) 0.4 %

(< 115 mm and/or oedema)	(0.1 - 3.0 95% C.I.)	(0.2 - 3.9 95% C.I.)	(0.1 - 3.2 95% C.I.)

Table 10: Prevalence of acute malnutrition by age, based on MUAC cut off's and/or oedema

		Severe wasting (< 115 mm)		**Moderate wasting (>= 115 mm and < 125 mm)**		**Normal (> = 125 mm)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	119	2	1.7	9	7.6	108	90.8	0	0.0
18-29	122	1	0.8	4	3.3	117	95.9	0	0.0
30-41	100	0	0.0	0	0.0	100	100.0	0	0.0
42-53	83	0	0.0	0	0.0	83	100.0	0	0.0
54-59	23	0	0.0	0	0.0	23	100.0	0	0.0
Total	447	3	0.7	13	2.9	431	96.4	0	0.0

Table 11: Prevalence of underweight based on weight-for-age z-scores by sex

	All n = 447	**Boys** n = 208	**Girls** n = 239
Prevalence of underweight (<-2 z-score)	(50) 11.2 % (8.0 - 15.4 95% C.I.)	(27) 13.0 % (9.1 - 18.1 95% C.I.)	(23) 9.6 % (6.0 - 15.1 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(43) 9.6 % (6.7 - 13.5 95% C.I.)	(23) 11.1 % (7.4 - 16.3 95% C.I.)	(20) 8.4 % (5.1 - 13.4 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(7) 1.6 % (0.7 - 3.5 95% C.I.)	(4) 1.9 % (0.7 - 4.9 95% C.I.)	(3) 1.3 % (0.4 - 3.9 95% C.I.)

Table 12: Prevalence of underweight by age, based on weight-for-age z-scores

		Severe underweight (<-3 z-score)		**Moderate underweight (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	119	1	0.8	9	7.6	109	91.6	0	0.0
18-29	122	2	1.6	16	13.1	104	85.2	0	0.0
30-41	100	1	1.0	8	8.0	91	91.0	0	0.0
42-53	83	3	3.6	8	9.6	72	86.7	0	0.0

54-59	23	0	0.0	2	8.7	21	91.3	0	0.0
Total	447	7	1.6	43	9.6	397	88.8	0	0.0

Table 13: Prevalence of stunting based on height-for-age z-scores and by sex

	All n = 447	**Boys** n = 208	**Girls** n = 239
Prevalence of stunting (<-2 z-score)	(39) 8.7 % (5.8 - 12.9 95% C.I.)	(24) 11.5 % (7.5 - 17.2 95% C.I.)	(15) 6.3 % (3.5 - 11.0 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(31) 6.9 % (4.6 - 10.3 95% C.I.)	(17) 8.2 % (4.7 - 13.8 95% C.I.)	(14) 5.9 % (3.3 - 10.1 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(8) 1.8 % (0.9 - 3.7 95% C.I.)	(7) 3.4 % (1.5 - 7.4 95% C.I.)	(1) 0.4 % (0.1 - 3.0 95% C.I.)

Table 14: Prevalence of stunting by age based on height-for-age z-scores

		Severe stunting (<-3 z-score)		**Moderate stunting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	119	1	0.8	5	4.2	113	95.0
18-29	122	4	3.3	16	13.1	102	83.6
30-41	100	0	0.0	3	3.0	97	97.0
42-53	83	3	3.6	7	8.4	73	88.0
54-59	23	0	0.0	0	0.0	23	100.0
Total	447	8	1.8	31	6.9	408	91.3

Table 15: Mean z-scores, Design Effects and excluded subjects

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	446	-0.73±1.08	1.02	1	0
Weight-for-Age	447	-0.73±1.01	1.44	0	0
Height-for-Age	447	-0.41±1.39	1.66	0	0

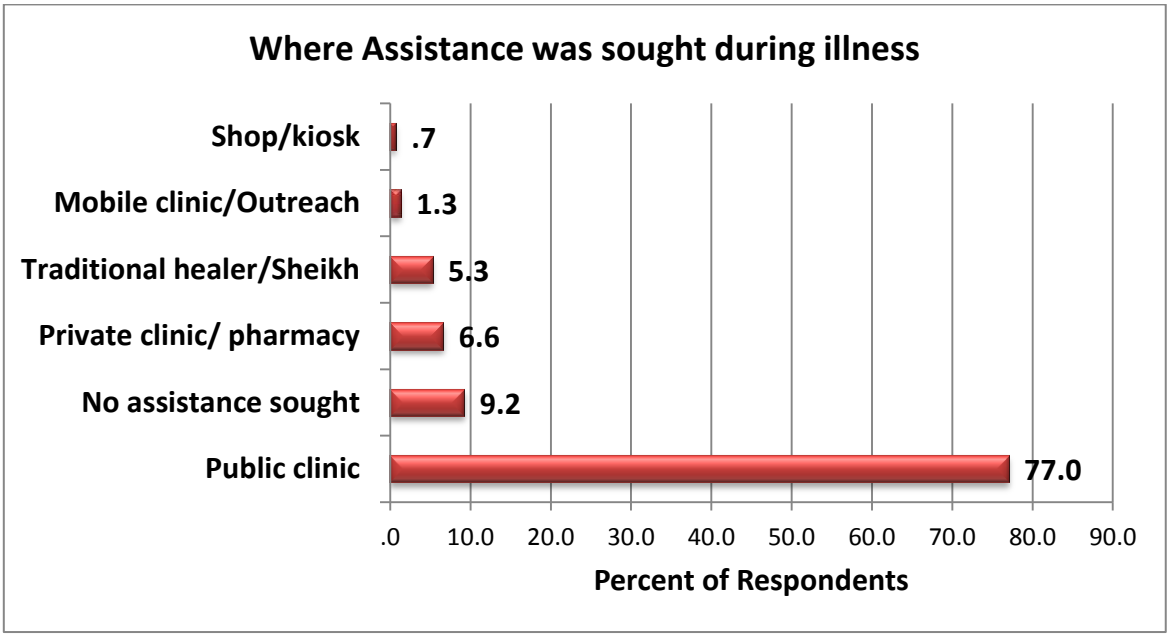
* contains for WHZ and WAZ the children with edema.

3.2 Children's morbidity

Table 16: *Prevalence of reported illness in children in the two weeks prior to interview (n= 243)*

Child Morbidity	Factor	Wajir East Nov 2012		Wajir South Nov 2012		Wajir East & South May 2013	
		No.	%		%	NO	%
Has child been ill in the last two weeks	Yes	243	37%	299	44.7%	196	43.8%
Sickness	ARIs	91	37%	140	46.7%	140	71.4%
	Diarrhoea	71	29%	89	29.9%	40	20.4%
	Fever with chills like Malaria	15	6%	82	27.3%	24	12.2%
	Vomiting	68	28%	30	9.9%	18	9.2%
	Others	32	13%	72	24%	68	37.4%

3.3 Health seeking behaviour



3.4 Vaccination Results

Table 17: ***Vaccination coverage: BCG for 6-59 months and measles for 9-59 months***

BCG SCAR	Present	94.0 % (420)

MEASLES 9-59 MONTHS	By Card	36.2 % (162)
	According to caretaker	53.7 % (240)
	Not Immunized	10.1% (45)
OPV 1	By Card	43.2%(193)
	According to caretaker	54.4%(243)
	Not Immunized	2.5%(11)
OPV 3	By Card	41.2%(184)
	According to caretaker	52.3%(234)
	Not Immunized	6.5%(29)
Deworming	Once	30.4% (136)
	Twice	32.2% (144)
	No	31.8% (142)
	Don't know	3.6%(16)

Table 18: Supplementation

	Factor	Wajir East 2012	Wajir South 2012	Wajir east and South May 2013
Vitamin A supplementation (6-11 months)	1 time	**76%**	**53%**	**68.1%(49)**
	>1 time	-	-	**4.2%(3)**
Vitamin A supplementation (≥12months)	1 time	**64.6%**	**48%**	**34.4%(129)**
	2 times	**27.1%**	**30%**	**48.3%(181)**
	>2 times	-	-	**5.3%(20)**
Iron/folate supplementation	Yes	**31.1(31)**	**26%(21)**	**46.7%(28)**
Zinc	In Diarrhoea mgt	**17.8%(13)**	**12%(11)**	**30% (12)**

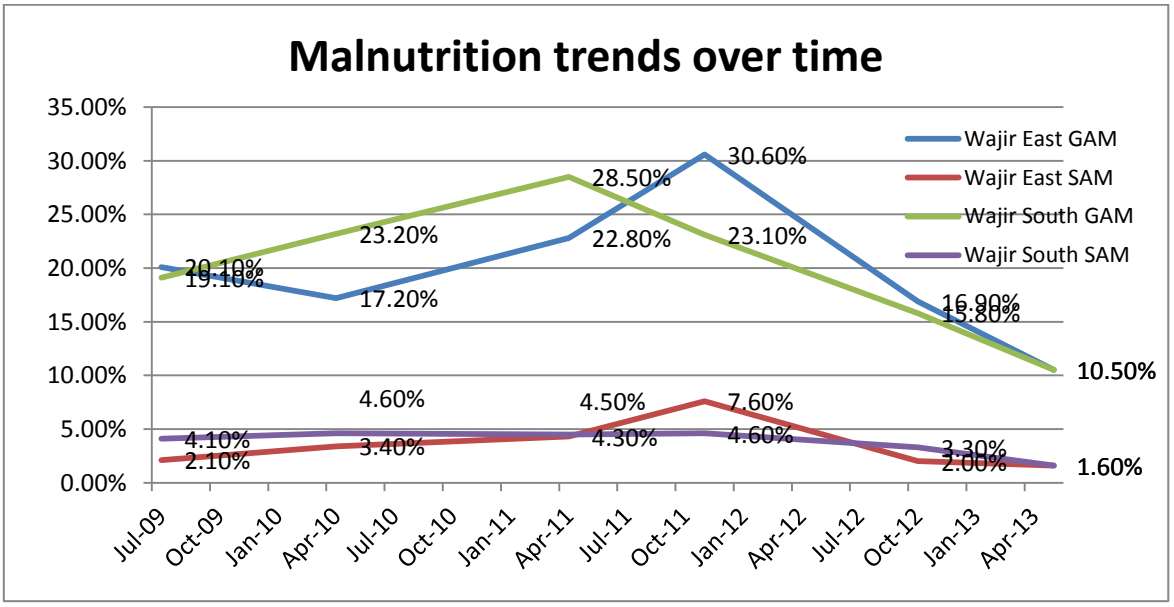
*of the 23 children who had received Vitamin A more than the expected number of times 15 were due to polio campaign, 5 during malezi bora and 3 due to illness.

4. Discussion

4.1 Nutritional status

The findings from this survey recorded a prevalence of Global Acute Malnutrition (GAM) of 10.5 % (7.9%-13.9% 95% CI)) and a SAM of 1.6%(0.8%-3.1% 95% CI). The rates were below the WHO emergency threshold of >15%. Since the survey done previously was done in each of the larger districts separately (Wajir East and Wajir South) these results could not be compared or the levels of confidence calculated with the CDC calculator however marginally there was an improvement compared to the GAM rates reported in October in the two districts at 16.9%(13.6-20.8 95%) and 15.8% in Wajir East and South respectively.

Figure 3: Malnutrition trends



4.1.1. Caretaker's nutrition status

Most of the female respondents were either pregnant (18.8%) or lactating (65.1%).

4.1.1.1. Caretakers MUAC

Physiological status	MUAC <21 cm	MUAC 21 – 23 cm	MUAC >23 cm
All Women 15 – 49 years	11.8%	24.1%	64.1%
PLWs	19.5%	31.7%	48.8%

4.1.1.2. Iron and Folic Acid Supplementation

Iron supplementation	Factor	Wajir East Oct 2012		Wajir South Oct 2012		Wajir South & East May 2013	
		No.	%	**No.**	**%**	**No**	**%**
Currently pregnant?	Yes	**91**	**18.8%**	**81**	19%	**60**	**14.8%**
Supplemented with Iron	Yes	**31**	**31.1%**	**21**	**26%**	**28**	**46.7%**

4.2 Causes of malnutrition

The nutrition survey was undertaken towards the start of the short rains therefore at the end of the Jilaal dry season. Malnutrition amongst children in the district were affected by the following factors:

4.2.1. Health status:

4.2.1.1. Morbidity:

Morbidity was high with sickness in the last two weeks reported among 43.8% of the children. The main reported diseases were; acute respiratory tract infections (71%), followed by diarrhoea (20.4%), fever with chills like Malaria (12.2%) Vomiting (9.2%), among others.

4.2.1.2. Vaccination, Micronutrient supplementation and De-worming coverage

The immunization coverage for all antigens BCG, Measles and Pentavalent/OPV 1& 3 were all above the recommended government rates of above 80% both by card and by recall. These good coverage were consistent with previous findings and could be attributed to Malezi bora campaigns and integrated outreaches provided in the community.

Vitamin A supplementation however was suboptimal with the age group above 12 months (post immunization) reporting 48.3% to supplementation twice in the previous year. Deworming and Iron Folate supplementation was also low reported at 32.2% and 46.7% respectively. The same was true for Zinc in the management of diarrhoea which was reported among only 30% of the children who had diarrhoea in the previous two weeks. This was however an increase from 17% reported in October 2012.

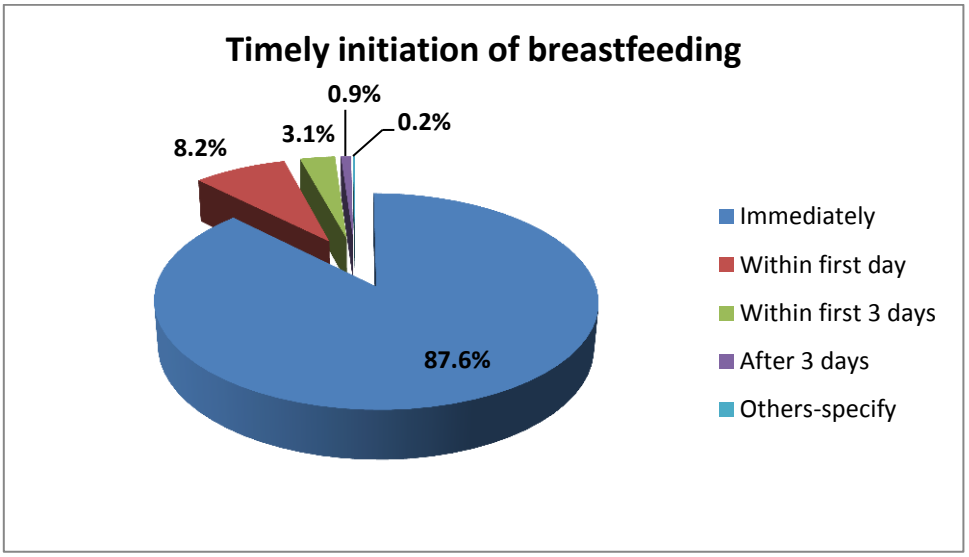
4.2.2. Infant and Young Child Feeding (IYCF)

Infant and young child feeding is a continuum of critical nutrition and health practices that begins during pregnancy and continues through at least the first two years of life. The sharpest increase in malnutrition occurs between 6 and 24 months of age[9][10], the time when children grow most rapidly and are introduced to other foods in addition to breast milk. Appropriate IYCF practices include timely initiation of breastfeeding within 1 hour of birth, exclusive breastfeeding for the first 6 months, complementary feeding after 6 months with continued breastfeeding up to 2 years, and improved feeding during and after illness. In this survey, the IYCF practices were considered to be sub-optimal and likely to contribute to the high malnutrition rates.

4.2.2.1. Timely Introduction to breastfeeding (n=429)

Most of the respondents at (97.2%) reported to having ever breastfed their children. Of these, 87.6 % reported to putting the baby on the breast within one hour of birth which exceeds the national targets of above 80% as shown in the figure below. The other respondents reported putting the baby within the first day (8.2%) with 3.1% reporting to putting the baby within the first three days.

Figure 4: Timely Initiation of Breastfeeding



4.2.2.2. Breastfeeding practices (EBF N=193, Con. BF 12-15=36, 20-23=56)

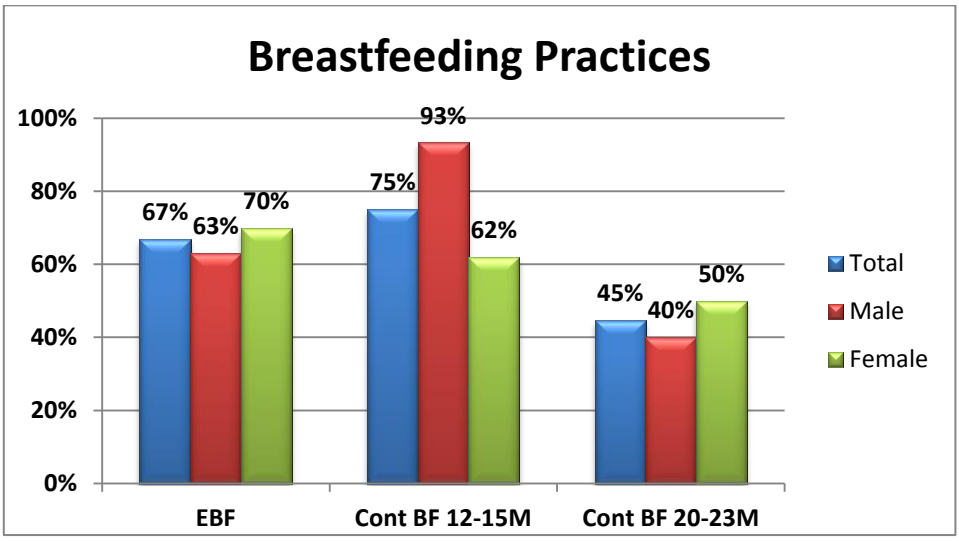
Exclusive breastfeeding is the proportion of infants 0-5 months of age who are fed exclusively with breast milk without receiving any other thing even water. In the two districts, the rates were reported at 69% among the two sexes but were reported slightly higher in

[9] KDHS 2008-2009

[10] Semba D. R. et al, Effect of Parental education on risk of child stunting in Indonesia and Bangladesh: a cross-sectional study; The Lancet 2008; 371:322-28

boys compared to girls as indicated below. This was higher than the national target of above 50%. Continued breastfeeding at 12-15 months was reported at 75 but the rates dropped by 30% at 20-23 months as shown in the figure below.

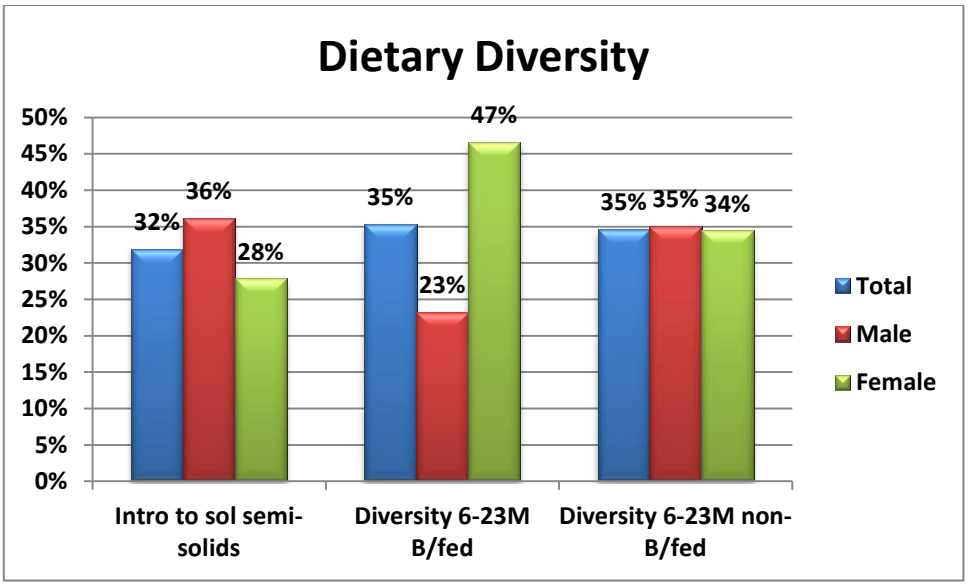
Figure 5: Exclusive Breastfeeding Rates



4.2.2.3. Complementary Feeding Practices (Sol=54, diversity=176)

Timely introduction to complementary foods to children aged between six months was reported at 31.5% which is below the recommended national target of above 80%. The rates were higher in boys compared to girls.

Figure 6: Timely introduction to complementary feeding and dietary diversity

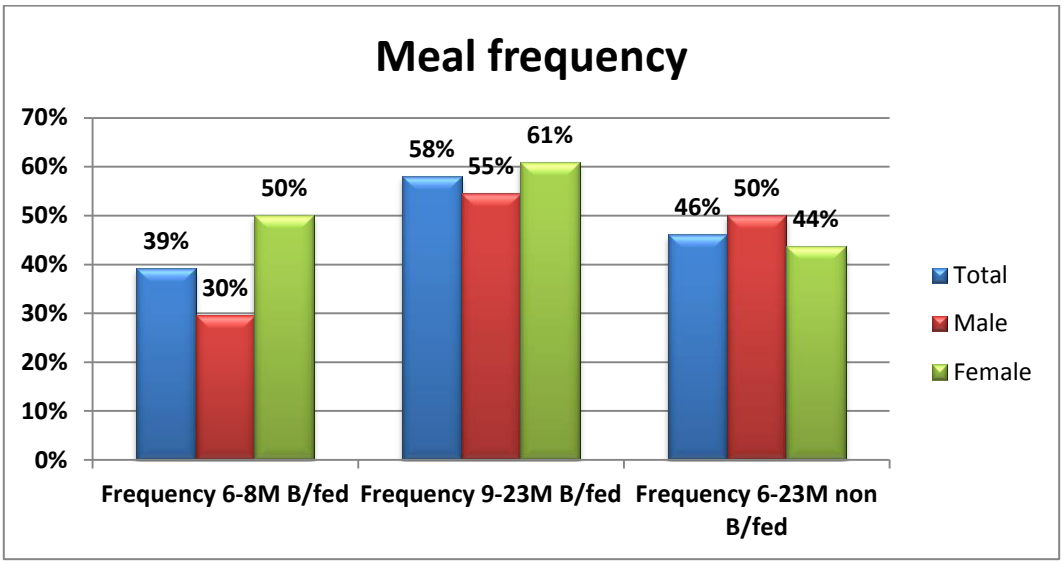


4.2.2.4 Meal Frequency (n=52 NBF, BF=119)

The frequency of feeding among children was reported at 39% for the age group 6-8

months breastfed, 58% for the 9-23 breastfed and 46% for the 6-23 non breast fed. This was below the recommended above 80 national targets. Among the Breastfed children the rates were higher in girls compared to boys while in the non-breastfed children the rates were slightly higher in boys.

Figure 7: Meal frequency

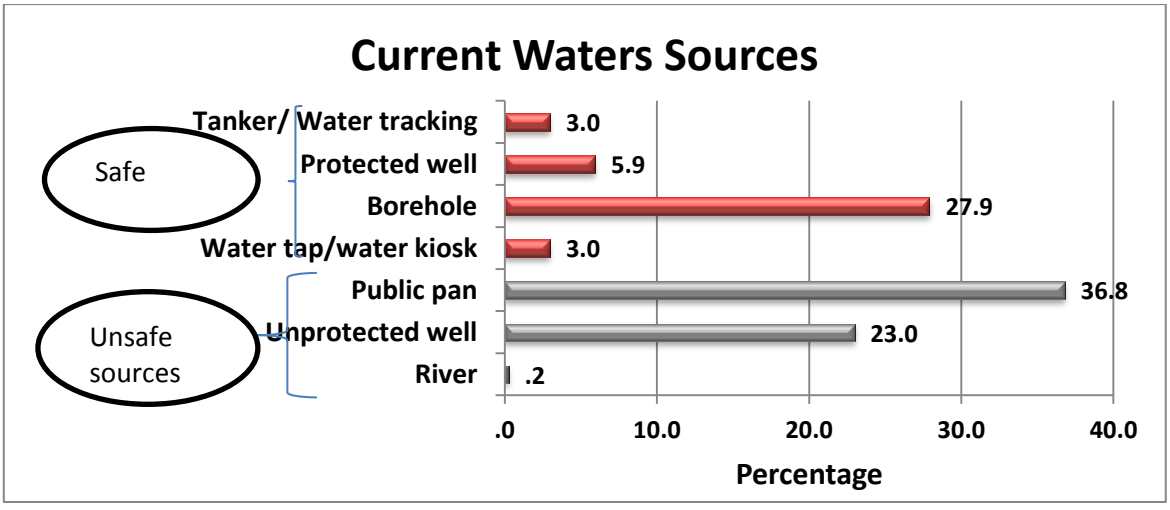


4.3. Water Sanitation and hygiene

4.3.1. Main water sources

The main sources of water for a majority of the population were public pan (36.8%), borehole (27.9%) and unprotected wells (23%). A few of the households got water from protected wells and water taps as shown below;

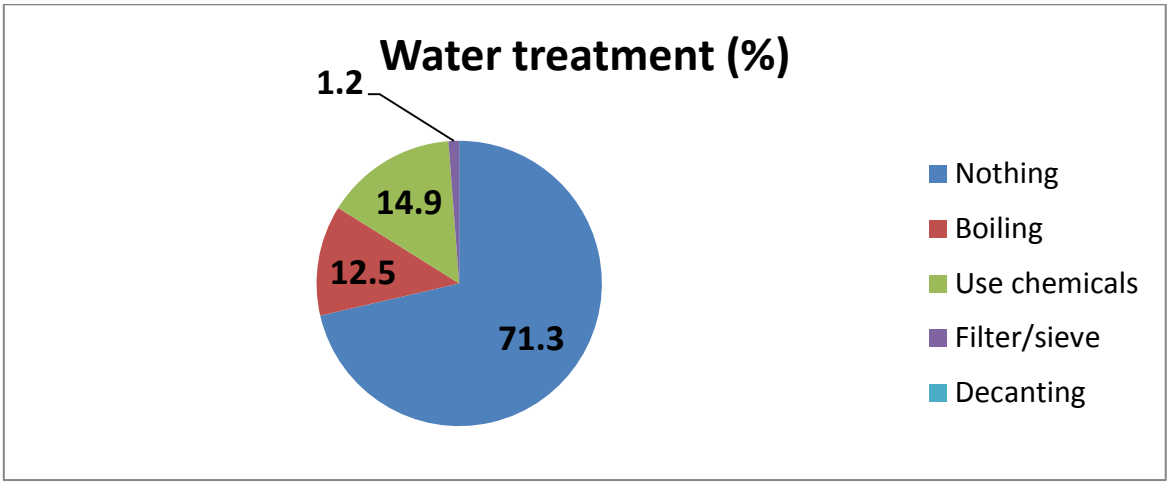
Figure 8: Main Water Sources



4.3.2. Water treatment

Though most of the respondents (62.3%) reported to having used water for unsafe sources, most respondents did not do anything to their drinking water (71%). However it should be noted that there was a remarkable drop from 94.3% reported in 2012. Boiling and use of chemical in water treatment was reported by around 12.5% and 14.9% of the respondents respectively as shown in the figure below;

Figure 9: Water Treatment



4.3.3. Hand washing practices

Around two thirds of the respondents reported to washing hands at the most critical timeswith most of the respondents (65.4%) washing hands appropriately as shown in the figures below;

Figure 10: Times of Hand-washing

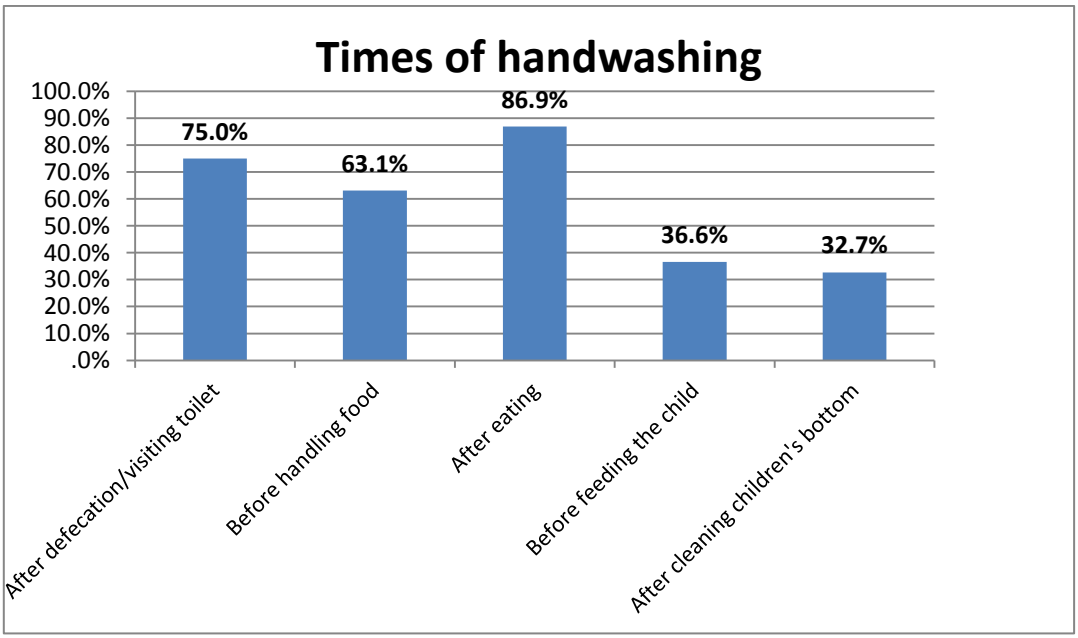
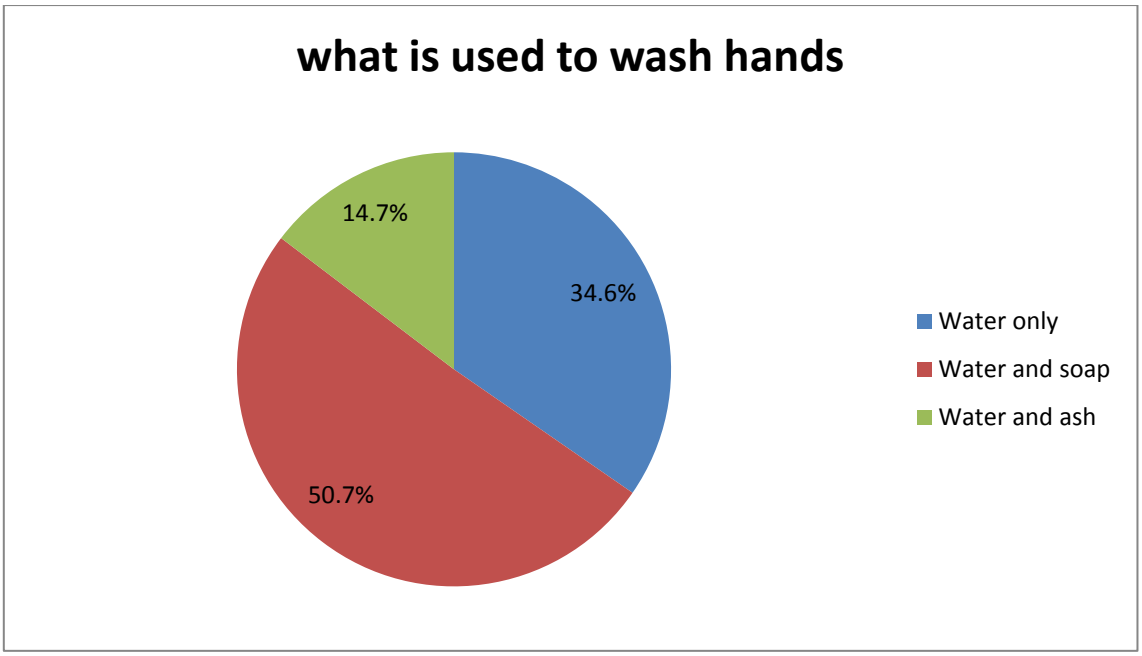


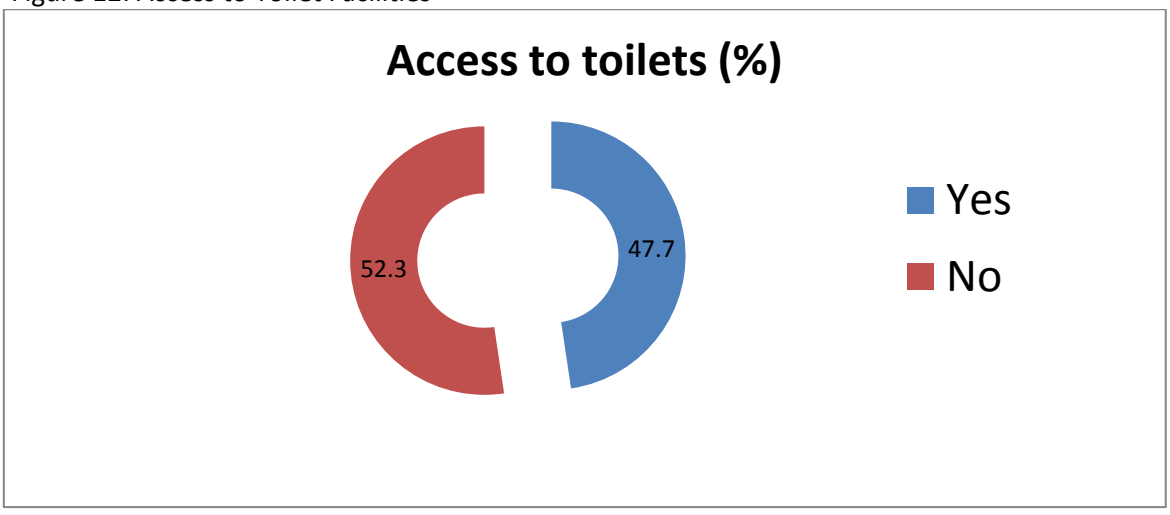
Figure 11: what was used to clean hands



4.3.4. Access to toilet facilities

About half of the respondents (47.7%) reported to having access to a toilet facility with 76.1% of the ones without access using the bush as the alternative for both adult and child faeces disposal

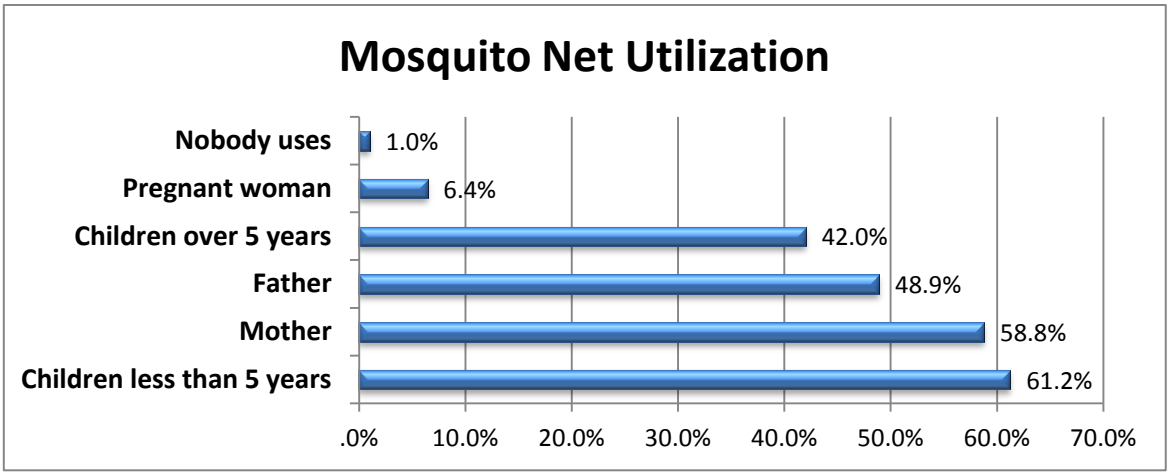
Figure 12: Access to Toilet Facilities



4.4. Malaria

72.3% of the respondents reported having a mosquito net. Of these 78.7% had gotten the net from the shop. Of those who had bought their net from a shop however only 12.2% had ever treated their net. The nets were mostly used by children <5, mother, fathers and children > 5 as shown in the figure below;

Figure 13: Mosquito Net utilization

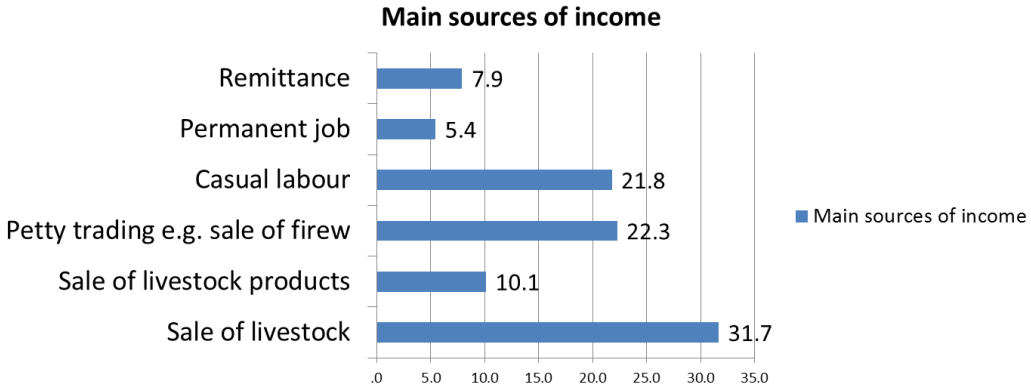


4.5. Food security and livelihoods

4.5.1. Main sources of income

Sale of livestock, petty trade and casual labour were the most reported sources of livelihood for the respondents.

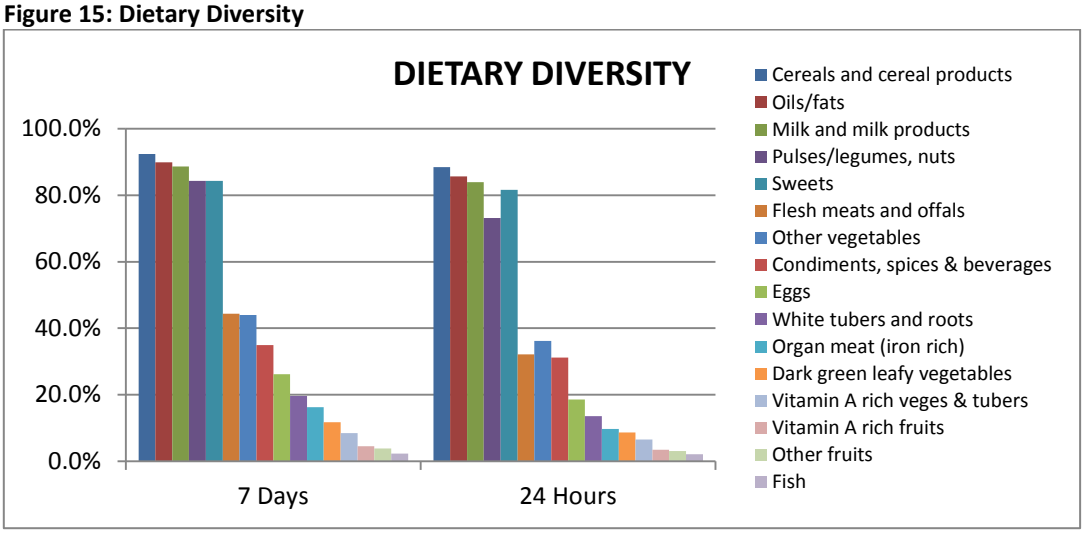
Figure 14: Main Sources of Income



4.5.2. Dietary diversity

Most of the households reported to consuming foods from five main groups both from 7 days and 24 hour recall namely Cereal and cereal products, oils and fats, milk and milk products, Pulses/legumes and nut, and sweets against the recommended 12 food groups by FAO. Other categories consumed by about 40% of the respondents included flesh meats and offal, other vegetables (not dark green) and condiments. The least consumed foods were fish, vitamin A rich fruits, vegetable and tubers and iron rich foods (organ meats and dark green vegetables). Most of the HH reported purchase as their main source of food for all categories.

Figure 15: Dietary Diversity



4.5.3. Food aid

The General Food Distribution was received by 49.1% of the respondents in the last 3 months. The Food Aid was from WFP/Lead Agency. 72.6% reported to consuming the food within the HH with around 10.3% sharing with kin. The food basket and the average number of weeks the food lasted varied as indicated in the graphs below

Figure 16: What respondents received in the GFD

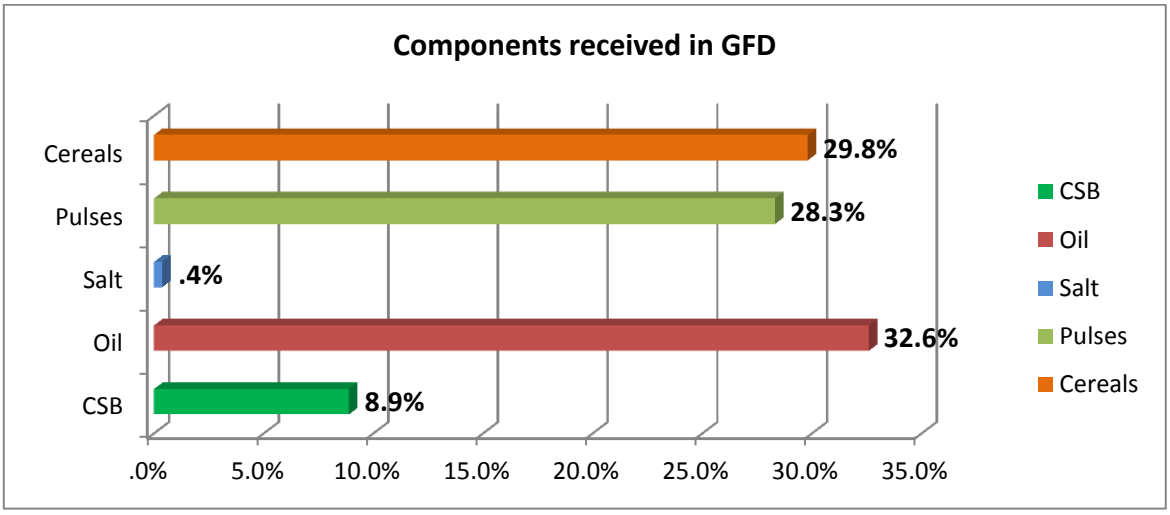
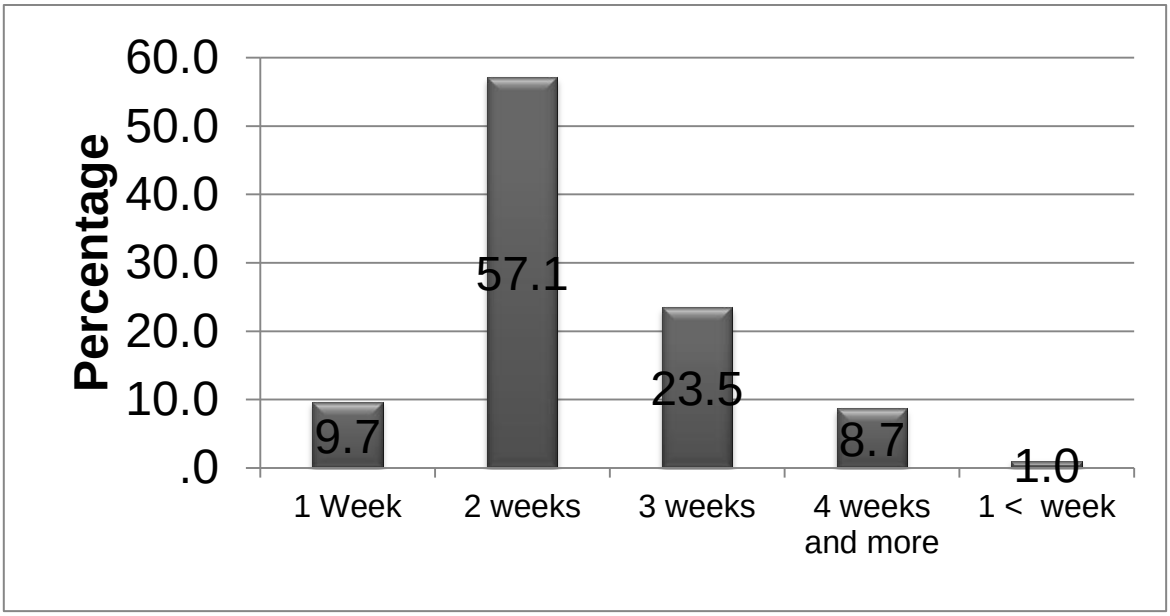


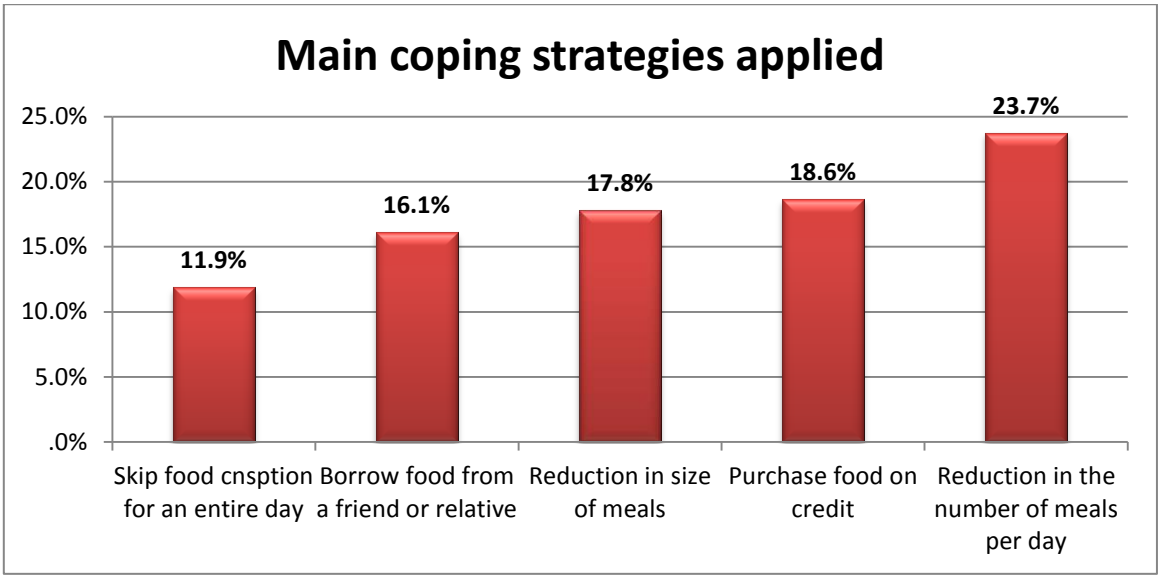
Figure 17: Duration that the food aid lasted



4.5.4. Coping Strategies

15.1.% reported to have experienced incidences that affected their ability to purchase or consume preferred foods. To make for this they engaged in a number of coping stategies. Among the highes empleoyed coping strategeis were reduction of te number of meals (23.7%) purchase of food on credit(18.6%) and reduction in size of meals (17.8%)

Figure 18: Coping strategies



5. Conclusions

The survey was conducted after the rainy season in May and this period was preceded by good rains in December thus animal production was good. The GAM rates 10.5% (7.9 – 13.9 95% CI)) were below the WHO emergency threshold. Zinc and vitamin A supplementation and deworming coverage were below the national recommendation of coverage >80%. The survey also reported poor WASH indicators with 71.3% of households not treating water for domestic use. Approximately half of the population (47.7%) did not have access to toilets. Though some indicators on optimal infant feeding were good (such as Exclusive breastfeeding, initiation of breastfeeding and continued breastfeeding at one year), poor IYCF indicators were reported especially on introduction to complementary food (31.5%), dietary diversity, and meal frequency which could be contributing factors to malnutrition. High morbidity cases (43.8%) with high cases of ARI reported at 71% and diarrhoea reported at 20.4% though associated with the rain season impact on child nutrition status. Most of the households reported to purchases being their main source of food.

6. Recommendations and priorities

Issues	Possible causes	Recommendations	By who
Low water treatment	-difficult to measure the shallow wells capacities. -Taste of aqua tabs not appealing. -community perception of aqua tabs as drugs	-Using stock solution(Treatment of water in known capacities i.e 20L Jerry-can) instead of crude chlorination -Hygiene education on water treatment	MOH with support from partners
Low Vit A & deworming coverage compared to national target	-Health workers not recording in the child welfare cards Mothers not being aware what's given to their children -poor health education and counseling by the HFs in charges.	-strengthen growth monitoring -linking Early Childhood Developments/Duksis and health facilities -Use of Monitor charts for the health facilities. -Health education when supplementing. -HFs to ensure accurate documentation on the Child Welfare Cards.	MOH with support from partners

Low complementary feeding interventions	-low community understanding on appropriate complementary foods. -under-developed markets	-More focus to be put on complementary feeding when giving HE -Utilize the WBW to sensitize divisions on CF --Provision of demonstration kits/food guide pyramids for the facilities/Outreach sites. -Support groups establish more kitchen gardens coupled with cooking demonstrations. -awareness creation and Health education through local media.	MOH supported by partners
Low toilet coverage	-low latrine construction by the communities. -Community belief on use of a common toilet for the family i.e parents vs children	-more emphasize to use of Community Led Total Sanitation approach in sensitizing the communities. -Explore through future Knowledge Practices and Coverage surveys on the beliefs and from this come up with appropriate recommendations. -Need to explore Child Health and Sanitation Trainings (CHAST) in school health clubs.	MOH with support partners.
Low Iron-folate supplementation	-Insufficient counseling to mothers during ANC visits.	-Counseling of mothers on importance of iron-folate supplements	DHMTs
Low Insecticide Treated Nets treatment	Use of Long Life Insecticide Treated Nets previously given through partners/MOH	-Demonstrations on ITNs treatment during health education and promotion activities.	MOH

7. References

Kenya Demographic and Health Survey 2008-2009

Kenya Nutrition Survey Guidelines Final Version 2012

Semba D. R. et al, Effect of Parental education on risk of child stunting in Indonesia and Bangladesh: a cross-sectional study; The Lancet 2008; 371:322-28

8. Appendicies

Appendix 1

Assignment of Clusters

Geographical unit Population size Assigned cluster

Appendix 2

Result Tables for NCHS growth reference 1977

Table 19: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

	All n = 447	**Boys** n = 208	**Girls** n = 239
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(49) 11.0 % (8.3 - 14.3 95% C.I.)	(26) 12.5 % (8.6 - 17.9 95% C.I.)	(23) 9.6 % (6.5 - 14.0 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(47) 10.5 % (8.0 - 13.8 95% C.I.)	(25) 12.0 % (8.0 - 17.7 95% C.I.)	(22) 9.2 % (6.3 - 13.3 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(2) 0.4 % (0.1 - 1.9 95% C.I.)	(1) 0.5 % (0.1 - 3.4 95% C.I.)	(1) 0.4 % (0.1 - 3.2 95% C.I.)

The prevalence of oedema is 0.0 %

Table 20: Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema

		Severe wasting (<-3 z-score)		**Moderate wasting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	119	1	0.8	14	11.8	104	87.4	0	0.0

18-29	122	0	0.0	13	10.7	109	89.3	0	0.0
30-41	100	1	1.0	6	6.0	93	93.0	0	0.0
42-53	83	0	0.0	10	12.0	73	88.0	0	0.0
54-59	23	0	0.0	4	17.4	19	82.6	0	0.0
Total	447	2	0.4	47	10.5	398	89.0	0	0.0

Table 21: Distribution of acute malnutrition and oedema based on weight-for-height z-scores

	<-3 z-score	**>=-3 z-score**
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 2 (0.4 %)	Not severely malnourished No. 445 (99.6 %)

Table 22: Prevalence of acute malnutrition based on MUAC cut off's (and/or oedema) and by sex

	All n = 447	**Boys** n = 208	**Girls** n = 239
Prevalence of global malnutrition (< 125 mm and/or oedema)	(447) 100.0 % (0.0 - 0.0 95% C.I.)	(208) 100.0 % (0.0 - 0.0 95% C.I.)	(239) 100.0 % (0.0 - 0.0 95% C.I.)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	(0) 0.0 % (0.0 - 0.0 95% C.I.)	(0) 0.0 % (0.0 - 0.0 95% C.I.)	(0) 0.0 % (0.0 - 0.0 95% C.I.)
Prevalence of severe malnutrition (< 115 mm and/or oedema)	(447) 100.0 % (0.0 - 0.0 95% C.I.)	(208) 100.0 % (0.0 - 0.0 95% C.I.)	(239) 100.0 % (0.0 - 0.0 95% C.I.)

Table 23: Prevalence of acute malnutrition by age, based on MUAC cut off's and/or oedema

		Severe wasting (< 115 mm)		**Moderate wasting (>= 115 mm and < 125 mm)**		**Normal (> = 125 mm)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	119	119	100.0	0	0.0	0	0.0	0	0.0
18-29	122	122	100.0	0	0.0	0	0.0	0	0.0
30-41	100	100	100.0	0	0.0	0	0.0	0	0.0
42-53	83	83	100.0	0	0.0	0	0.0	0	0.0
54-59	23	23	100.0	0	0.0	0	0.0	0	0.0
Total	447	447	100.0	0	0.0	0	0.0	0	0.0

Table 24: Prevalence of acute malnutrition based on the percentage of the median and/or oedema

	n = 447
Prevalence of global acute malnutrition (<80% and/or oedema)	(27) 6.0 % (4.4 - 8.3 95% C.I.)
Prevalence of moderate acute malnutrition (<80% and >= 70%, no oedema)	(25) 5.6 % (3.9 - 7.9 95% C.I.)
Prevalence of severe acute malnutrition (<70% and/or oedema)	(2) 0.4 % (0.1 - 1.9 95% C.I.)

Table 25: ***Prevalence of malnutrition by age, based on weight-for-height percentage of the median and oedema***

		Severe wasting (<70% median)		**Moderate wasting (>=70% and <80% median)**		**Normal (> =80% median)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	119	1	0.8	6	5.0	112	94.1	0	0.0
18-29	122	0	0.0	7	5.7	115	94.3	0	0.0
30-41	100	1	1.0	4	4.0	95	95.0	0	0.0
42-53	83	0	0.0	7	8.4	76	91.6	0	0.0
54-59	23	0	0.0	1	4.3	22	95.7	0	0.0
Total	447	2	0.4	25	5.6	420	94.0	0	0.0

Table 26: Prevalence of underweight based on weight-for-age z-scores by sex

	All n = 447	**Boys** n = 208	**Girls** n = 239
Prevalence of underweight (<-2 z-score)	(72) 16.1 % (12.0 - 21.2 95% C.I.)	(35) 16.8 % (12.3 - 22.5 95% C.I.)	(37) 15.5 % (10.5 - 22.2 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(65) 14.5 % (10.7 - 19.4 95% C.I.)	(31) 14.9 % (10.4 - 20.9 95% C.I.)	(34) 14.2 % (9.7 - 20.4 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(7) 1.6 % (0.7 - 3.5 95% C.I.)	(4) 1.9 % (0.7 - 4.9 95% C.I.)	(3) 1.3 % (0.4 - 3.9 95% C.I.)

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

		Severe underweight (<-3 z-score)		**Moderate underweight (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	119	1	0.8	16	13.4	102	85.7	0	0.0

18-29	122	2	1.6	25	20.5	95	77.9	0	0.0
30-41	100	1	1.0	11	11.0	88	88.0	0	0.0
42-53	83	3	3.6	10	12.0	70	84.3	0	0.0
54-59	23	0	0.0	3	13.0	20	87.0	0	0.0
Total	447	7	1.6	65	14.5	375	83.9	0	0.0

Table 28: Prevalence of stunting based on height-for-age z-scores and by sex

	All n = 447	**Boys** n = 208	**Girls** n = 239
Prevalence of stunting (<-2 z-score)	(23) 5.1 % (3.1 - 8.4 95% C.I.)	(14) 6.7 % (3.9 - 11.4 95% C.I.)	(9) 3.8 % (2.0 - 7.1 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(17) 3.8 % (2.2 - 6.4 95% C.I.)	(9) 4.3 % (2.1 - 8.5 95% C.I.)	(8) 3.3 % (1.6 - 6.8 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(6) 1.3 % (0.6 - 2.9 95% C.I.)	(5) 2.4 % (1.0 - 5.5 95% C.I.)	(1) 0.4 % (0.1 - 3.0 95% C.I.)

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

		Severe stunting (<-3 z-score)		**Moderate stunting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	119	1	0.8	2	1.7	116	97.5
18-29	122	3	2.5	9	7.4	110	90.2
30-41	100	0	0.0	1	1.0	99	99.0
42-53	83	2	2.4	5	6.0	76	91.6
54-59	23	0	0.0	0	0.0	23	100.0
Total	447	6	1.3	17	3.8	424	94.9

Table 30: Mean z-scores, Design Effects and excluded subjects

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	447	-0.93±0.93	1.00	0	0
Weight-for-Age	447	-0.97±1.01	1.68	0	0
Height-for-Age	447	-0.26±1.30	1.47	0	0

* contains for WHZ and WAZ the children with edema.