NUTRITIONAL ANTHROPOMETRIC AND MORTALITY SURVEY

FINAL REPORT

WAJIR EAST AND SOUTH DISTRICT

NORTH EASTERN PROVINCE, KENYA

18th to 26th JUNE 2014

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- Village guides and Community members who willingly participated in the survey and provided the information needed.

Acronyms

ALDEF	-	Arid Lands Development Focus
APHIA Imarisha	-	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, Tarbaj and Wajir South Sub-counties are three of the 6 sub-counties within the larger Wajir County. The three sub-counties comprise of 11 administrative divisions namely Wajir Bor, Central and Khorof Harar in Wajir East sub-county, Tarbaj, Kutulo, and Mansa in Tarbaj Sub-County and Habaswein, Sabuli, Banane, Diif and Kulaaley divisions in Wajir South Sub-County. The sub-counties lie around 3° north of the Equator and border Somalia to the East, Lagdera to the South, Wajir West Sub-County to the West, ute Sub-County to the North West and Mandera Central Sub-County to the North.Wajir Eats, South and Tarbaj sub-counties, measuring approximately 38,471 km^2 (Wajir East & Tarbaj -14,471 km^2 and Wajir South-24,000km^2), are gazetted as Arid and Semi-Arid Lands (ASAL) of Kenya. Wajir town which is also in Wajir East sub-County is the county headquarters and is the largest urban town in Wajir County. The three sub-counties 2014 projected population is currently estimated at 364,097[1] persons.

The main livelihood activity in the three sub-counties is pastoralism and being predominantly arid, the sub-counties 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.

There are several NGOs working in the County which include Wajir South Development Association (WASDA, Arid Lands Development focus(ALDEF, OXFAM, World Food Programme (WFP),Save the Children, Islamic Relief Kenya, Kenya Red-Cross society, Veterinarians sans frontiers, World Vision (VSF), ADESO, Mentor Initiative and District Pastoral Association (DPA).

Save the Children has been present in Wajir East and South since 2009 with interventions in maternal health and nutrition (High Impact Nutrition Interventions-HINI, nutrition surveillance, health (capacity building and health systems strengthening for maternal and child health and nutrition), Water, Hygiene and Sanitation (WASH) and food security and livelihoods. Save the Children in collaboration with the Department of Health and on behalf of the County steering group undertakes annual nutrition surveys (before the long rains) to monitor the nutrition situation. This survey was undertaken annually between May& June to evaluate the nutrition status of the population as well to double as ongoing nutrition surveillance.

Goals and objectives

Overall Goal

The overall goal of this survey was to assess the health and nutritional status of children less than 5 years of age. The survey results will constitute the nutrition surveillance system as well as provide information for program planning.

Specific Goal

The survey aimed at estimating;

- The prevalence of acute and chronic malnutrition in children aged 6-59 months;
- The nutrition status pregnant women and mothers with children <5 years ;
- The proportion of households with access to improved water and sanitation;

[1] Figures from the District Development Office

- The coverage of the general food distribution in terms of frequency and content;
- The food availability and access at HH level;
- The coverage of measles and BCG vaccination among target children;
- The coverage rate of Vitamin A. capsules distribution;
- The morbidity rates children 6-59 months and pregnant women and mothers with <5 years children 2 weeks prior to the survey;
- To recommend appropriate interventions based on the survey findings;

Area covered

The survey was conducted from 14th to 26th June 2014 and covered the 11 administrative divisions, three (3) in Wajir East namely: Central, Wajir Bor, and, Khorof Harar, three (3) divisions in Tarbaj Mansa, Kutulo and Tarbaj and 5 in Wajir South namely Habaswein, Sabuli, Banane, Diif and Kulaaley

Methodology

Emergency Nutrition Assessment (ENA) for Standardized monitoring of Relief in Transitions (SMART) was used to calculate anthropometry and mortality samples. Proportion to Population Size (PPS) was used to identify clusters within a study area after collecting population data from all villages/ sub locations that were considered as clusters. While systematic random sampling was used to select households in selected clusters.

Main survey results

Table 1: Results Summary

Characteristic	**N**	**2014 % (95% CI) 2014**	**n**	**2013 % (95% CI)**
GAM (WFH <-2 Z score or presence of oedema) - WHO 2006	655	16.8%(13.9-20.2)	110	10.5% (7.9 – 13.9)
SAM (WFH <-3 Z score or presence of oedema) - WHO 2006	655	3.1% (2.0-4.7)	20	1.6% (0.8 – 3.1)
Prevalence of GAM by MUAC (<12.5cm)	663	6.9 % (5.0-9.6)	46	3.6 % (2.1 - 5.9)
Proportion of children sick two weeks prior to survey	743	28.8%	214	43.8%
Proportion of caretakers seeking medical care when child is ill	214	76.3%	161	84.9%
BCG Scar present	742	91.1%	676	94%
Measles immunization (by card and confirmation)	705	86.1%	607	89.9%
OPV1 immunization (by card and confirmation)	742	88.9%	660	97.6%
OPV3 immunization (by card and confirmation)	740 (2 missing)	83.7%	619	93.5%
Vitamin A supplementation coverage ≥12 month) -1 time	652	20.4%	133	34.4%
Vitamin A supplementation coverage (≥12 month) -2 times	652	33.4%	231	53.6%

Vitamin A supplementation coverage (6-11 months)- 1 time	87	51.7%	45	72.3%
Proportion of children >1 year de-wormed 1 time	641	25.9%	166	30.4%
Proportion of children >1 year de-wormed 2 times	641	14.7%	94	32.2%
Iron-folate Supplementation for pregnant mothers	265	31.3%	83	46.7%
Appropriate hand-washing with soap/ash		26%		65.4%

Summary of findings

- There is an increase in GAM rates 2014 from 10.5(7.9-13.9) in 2013 to 16.8 (13.9-20.2).Further analysis of the Wajir results with the CDC calculator indicates a 0.004 probability (99.6%) that the prevalence rates in the June 2014 survey were higher than those of June 2013 hence indicating a worsened nutrition situation.
- Acute respiratory diseases remain the major morbidity among children under the age of five years however there was an increased in cases that reported fever with chills like malaria from 12.2% in 2013 to30.9% in 2014.
- 77% of the respondents with sick children reported to having sought care when their children were sick. There was an increase however of caretakers who did nothing when their children were sick from 9.2% in 2013 to 23.7% in 2014
- Micronutrients and deworming remains low with children dewormed twice in the previous year reported at 32.2%, Vitamin A supplementation twice for the children 12-59 Months reported at 52.6% and at 72.6% once among the children 6-11 months.
- Iron Folate supplementation among the pregnant women was reported at 46.7% and even this was an increase from last year's 31.3%, it is still below the national target of 80% and above. Of concern as well is that even if the recommended utilization period currently is 270 days a majority of the women who had children less than 24 months (30%) had only consumed the iron folate supplements for 17 days.
- The number of households still not treating water remains high despite health and hygiene promotion and distribution of water treatment chemicals at the community level
- There was good immunization coverage of above 80% on all antigens , though high coverage was through recall
- Good utilization of LLITNs by the under-fives (62%), with low Percent reported to have ever treated it. However it will be important to monitor usage throughout the year.
- There is improved toilet coverage compared to last survey. This could be attributed to CLTS and hygiene promotion.
- Water treatment coverage is still low. Need to explore further on why the community Hygiene education along this intervention.

*R*ecommendations

Table 2: Recommendations

Issues	Possible causes	Recommendations	By who
High malnutrition rates among <5s and women of reproductive age(WRAs)	-Inter clan conflicts -failure of long rains leading to prolonged dry spell -Poor dietary diversity -Training gap for the HWs on Growth monitoring. -Inadequate of infant and Bathroom scales for growth monitoring for children <6 months	-Increase the coverage of health and nutrition outreach activities to all the sites which are not included in the current coverage of services. -Conduct monthly mass screening More emphasis on Birth spacing. -More cooking demonstration sessions. -Encourage mothers to join Care support groups for moral support -Strengthen growth monitoring -procure bathroom and infant weighing scales. -Need to explore further on other possible causes.	DOH with support from partners
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 promotion on water treatment and storage.	DOH with support from partners
Low Iron-folate supplementation	-Insufficient counseling to mothers during ANC visits. -Poor reporting	-Counseling of mothers on importance of iron-folate supplements -More OJT and emphasis on reporting	SCHMTs & 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. -Need to explore Child Health and Sanitation Trainings (CHAST) in school health clubs.	DOH with support from partners.
Low LLITNs coverage		Health promotion sessions on LLITNS use with emphasis to Children <5s and PLWs	DOH

Low Vitamin A & deworming coverage compared to national target	-Poor health education and counseling by the HFs in charges. -Poor reporting due prescription	-Sensitizing the ECD teachers and maalim Duksis on importance Vitamin A supplementation and De-worming and modes of administration and link to the ECDs/ Duksis and health facilities -Use of Monitor charts for the health facilities. -Health education when supplementing. -Explore options of using Mother and child heath booklet to record the supplements. Increased OJT on reporting and emphasis on importance	DOH with support from partners
High diarrheal diseases	-Population displacement that leads to lack of portable water -Poor health education and interference of the livelihood systems which most of the population were dependent on.	Early warning signs and contingency plans should be developed to inform the upcoming disasters like conflicts, droughts etc. in good time so that in the event of a disaster the plan is only to be activated.	NDMA/partners and DOH

1.0. INTRODUCTION

1.1. Background

Wajir County is one of the 47 counties created under the Kenya constitution 2010.It borders Somalia to the East, Ethiopia to the North, Mandera County to the North East, Isiolo County to the South West, Marsabit County to the West and Garissa County to the South. The County comprises of six sub-counties namely Wajir East, Tarbaj, Wajir West, Eldas, Wajir North and Wajir South. The County receives an average of 240mm precipitation annually and an average temperature is 27.9°C. Projections from the Kenya 2009 population and housing census indicate that the County has a total population of 727,965.

Wajir East, Tarbaj and Wajir South sub-counties are two of the 4 districts within the larger Wajir County. The two sub-counties comprise of 11 administrative divisions namely Wajir Bor, Tarbaj, Kutulo, Central, Mansa and Khorof Harar 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 km^2 (Wajir East -14,471 km^2 and Wajir South-24,000km^2), 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 sub-counties population is currently estimated at 364,097 persons.

The majority of the inhabitants are Somalis although a few other communities such as the Borana live in the sub-counties. The pastoralist populations in these sub-counties continue to operate in fragile and precarious environments characterized by long dry spells, interspersed with low erratic rainfalls. Persistent and sporadic inter-clan conflicts, often resulting from disputes over limited resources and spill-over of the insecurity in Somalia, has together with poor infrastructure, limited the mobility in the area. Wajir County is categorized as Arid and Semi-Arid Lands (ASAL) because of erratic, infrequent rainfall resulting in chronic drought. In addition, these often marginalized communities continue to suffer from structural deficits in the provision of health care, education, water and sanitation infrastructure. Despite many years of humanitarian and relief interventions and improved government assistance, the Wajir is still largely food insecure.

The population in the two larger sub-counties is predominantly Muslim and of Somali ethnicity, and is divided into clans, with village 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 is 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 40 operational Department of Health (DOH) health facilities including Wajir level 5 hospital, Tarbaj and Habaswein Sub county hospitals and 2 nomadic dispensaries(in Habaswein and Tarbaj)

Save the Children has since October 2012 through ECHO and DFID funding been offering technical, Logistical and financial support to MOH to carry out Maternal, new-born and Child health and nutrition(MNCH) interventions including the eleven (11) High Impact Nutrition Interventions (HINI) components in the Sub-counties. The 11 HINI components are: prevention and treatment of Integrated Management of acute malnutrition (IMAM),

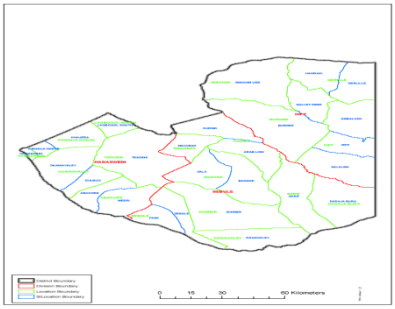
promotion of Exclusive breastfeeding up to 6 months, Optimal complementary feeding at six months, twice yearly supplementation of Vitamin A, Deworming, micronutrient powder supplementation, Zinc supplementation in diarrhoea management, Iron and folate supplementation in pregnancy, salt iodization, growth monitoring and Hand-washing.

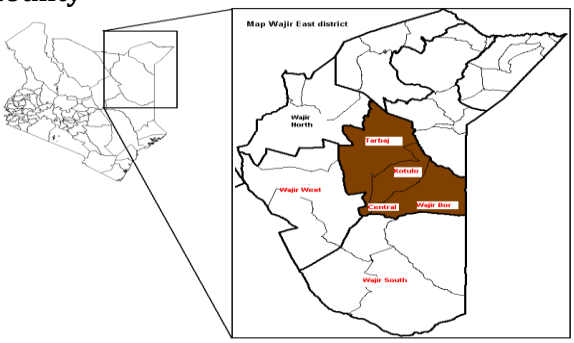
1.1.1. Area covered

The survey was conducted from 14thto 24th June 2014 and covered the 11 administrative divisions, 6 in Wajir East Sub-County namely: Central, Wajir Bor, Khorof Harar I Wajir East and Kotulo, Mansa and Tarbaj in Tarbaj and 5 in Wajir South namely Habswein, Sabuli, Banane, Diif and Kulaaley

Figure 2: Map of Wajir East & Tarbaj Sub County

Figure 1: Map of Wajir South Sub County





1.1.2. Geography

Wajir East and South sub counties are featureless plain, which is prone to flooding during the rainy seasons which makes the roads impassable. The districts have some seasonal swamps and perennial river beds/drainage lines ('laghas') that flow in the rainy season allowing some cultivation when it rains and they also serve as dry season grazing zones. The seasonal swamps are in Lagboghol area and in the western and southern part of Habaswein area. 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[2]. However the rains have become increasingly unpredictable and erratic with the last long rains.

The topography of the two sub counties is a slightly elevated plateau, which lies between 150-200m above sea level. The mean annual temperature of the sub counties is 29°C and ranges from 28°-39°C. The sub counties 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.

1.1.3. 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

[2] District Development Office- Summary document for Key Investment Opportunities in Wajir East District

exploiting the range lands hence pastoral activities are practiced all over the sub counties

1.1.4. Current Climatic Conditions and Food Security

Persistent incidences of drought and their increasing unpredictability in the county in recent years has 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 sub county, 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. Some of the factors affecting food security in Wajir County currently are poor performance of 2014 rains, inadequate quality pastures and browse, inter-clan clashes between the warring communities and high food price especially livestock products(meat and milk)limiting access

Table 3: 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 May/June 2014 showed Global Acute Malnutrition (GAM) rates of 16.8% in Wajir East and Wajir South. This indicated a worsening nutrition situation compared to 2013 when the GAM rates were 11.5%.

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: poor maternal, 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)[3], and cultural beliefs and practices which have a negative effect on the uptake of health and nutrition services.

1.1.5. Humanitarian interventions in Tarbaj, Wajir East and south sub-counties

Save the Children has been implementing programmes in larger Wajir East and South sub-counties since August 2009. In 2012 the county adopted the national nutrition strategy which applies the High Impact Nutrition Interventions (HINI) approach in dealing with malnutrition with support (technical, logistical and Human resource) being provided to the DOH to accelerate provision of the package in the three sub-counties. Other programs supported by Save The Children in the county include Health (Maternal new-born and Child Health programmes funded by DFID and GSK with an aim of addressing the underlying causes of malnutrition through health strengthening systems, treatment for acute

[3] Kenya Demographic Health Survey 2008-2009

malnutrition
WFP through ALDEF has been supporting the county through General Food Distribution (GFD) in Wajir County In 2014 The GFD food basket provides a 50%ration scale of 2,100Kcal/person, the daily per capita energy requirement[4] and is as follows:

Table 4: 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 programs through the County Commissioner's office occasionally supplies food to the region and this is usually divided equally among the divisions. A regular 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.
UNICEF: Health systems strengthening
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 food security and livelihood interventions
CARITAS: undertaking WASH interventions

1.2. Survey Objectives

1.2.1. General objective

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.

1.2.2. 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 ;
- The proportion of households with access to improved water and sanitation;
- 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;

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

2.0. METHODOLOGY

2.1. Geographic target area and population group:

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 Khorof Harar 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 km^2 (Wajir East -14,471 km^2 and Wajir South-24,000km^2), 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[5] persons.

2.2. Survey Sampling:

Emergency Nutrition Assessment (ENA) for Standardized Monitoring of Relief and Transition (SMART) was used to calculate both anthropometry and mortality samples. A 2 stage cluster sampling method with Probability of Proportion to Population Size (PPS) was used to identify clusters within a study area after collecting population data from all villages that were to be considered as clusters.

2.2.1. Sample size calculation

The sample size for the anthropometric survey was calculated using the SMART survey calculator in the ENA software. The projected population size for 2014 for the district was used as the sampling frame. The population was obtained from the District development officer.

2.2.2. Parameters used in Anthropometry Sample size calculation

2.2.2.1. Anthropometry sampling

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

1) The estimated prevalence of malnutrition is 13.6%[6]
2) The design effect is 1.18[7]
3) Precision of 3%[8]
4) Average household size 7[9]
5) Proportion of under-fives 17.9%[10]

Using the above parameters, the sample for anthropometry was arrived at as shown in the table below;

Table 5: Final sample size

Estimated prevalence	Precision	Design effect	% of none response	Sample size anthropometry	HH anthropometry.	No of HH per day	No. of clusters
13.6%	3%	1.18	1%	644	673	17	40

[5] Figures from the District Development Office
[6] Based on SMART survey findings 2013
[7] Based on SMART survey findings 2013
[8] Following Kenya National Survey Guidelines
[9] Based on SMART survey findings 2013
[10] KDHS

2.2.2.2. Mortality sample Calculation

Table 6: Mortality Sample Calculation

Estimated death rate	Precision	Design effect	% of none response	No of Recall days	Sample size mortality	HH mortality.	No of HH per day	No. of clusters
0.44%	0.3%	1.18	1%	117	2062	342	17	40

From the figures above, 2,062 people were to be included in the mortality sample. In total to get this number of people, 342 households were to be visited. However comparing the number of HH from the mortality sample and from the anthropometry sample, the anthropometry sample size was higher and therefore this number of HH (673) was considered and mortality was collected in these HHs as well as anthropometry.

2.2.3. Sampling Procedure: Selecting household and children

The second sampling stage comprised of the household selection. Only the randomly sampled villages were assessed during data collection. Systematic Random Sampling method was used in the selected villages to select households to be assessed. An updated list of the household heads in the selected villages was obtained from the village chiefs and where not available from the village elders. Thereafter 17 households were selected randomly through a random number generator application on the tablets used to collect data

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 6-59 in every household visited were included in the anthropometric survey while all household members were part of the mortality survey. In cases where there was no eligible child, a household was still considered part of the sample and its household data and mortality 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.

2.2.4. Case definitions and inclusion criteria

2.2.4.1. Anthropometric data:

Age: the age of the child was recorded based on a combination of 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.

2.2.4.2. 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.

2.2.4.3. Vaccination status and coverage:

For all children 6-59 months, information on Pentavalent 1 and Oral polio Vaccine (OPV) 1 and Pentavalent 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.
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.

2.2.5. Causes of malnutrition data

Secondary data on causes of malnutrition was mainly obtained from previous surveys undertaken in the area.
Primary data on the causes of malnutrition was obtained from interviewing mothers/caretakers of children based on the household questionnaire that contained questions of water sources and hand washing practice, main sources of food and income, use of mosquito nets, dietary diversity and nutritional status of mothers/caretakers. The questionnaires were based on the national guidelines for nutritional assessments in Kenya, and modified slightly to collect context specific data for Mandera Central. Data was collected from 540 households.

2.2.6. Nutritional Status Cut-off Points

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

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

Wasting reflects the current health/nutritional status of an individual. The results on wasting are 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 NCHS reference population/WHO standards 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 NCHS reference population/WHO standards or had bilateral oedema were classified as severely wasted (to reflect SAM)
- Children whose WFH indices were <80% of the NCHS median or had bilateral oedema were classified as wasted (to reflect GAM)
- Children whose WFH indices were <70% of the NCHS median or had bilateral oedema were classified as severely wasted (to reflect SAM)

2.2.6.2. 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 very useful in growth monitoring.

- Children whose WFA Z scores fell below -2 standard deviations from the median of the NCHS reference population or had bilateral oedema were classified as underweight
- Children whose WFA Z scores fell below -3 standard deviations from the median of the NCHS reference population or had bilateral oedema were classified as severely underweight.

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

Height-for-age is a measure of linear growth and therefore an unequivocal reflection of cumulative past nutritional inadequacy.

- Children whose HFA Z scores fell below -2 standard deviations from the median of the NCHS reference population were classified as stunted (to reflect Global Stunting)
- Children whose HFA Z scores fell below -3 standard deviations from the median of the NCHS reference population were classified as severely stunted.

2.2.6.4. Mid upper arm circumference (MUAC)

The guidelines used for < MUAC for under- fives was as follows;
MUAC < 11.5 cm severe malnutrition and high risk of mortality
MUAC _ 11.5 cm and <12.5cm moderate malnutrition
MUAC _12.5cm and < 13.5 cm moderate risk of malnutrition
MUAC _ ≥13.5 cm satisfactory nutritional status
The cut-off point for pregnant women's MUAC was < 23.0 cm and that of non-pregnant women <21.0 cm (as indicators of delineating energy deficiency) according to SPHERE standards[11]

Table 7: Maternal MUAC Cut-off Points

Nutritional status	Pregnant	Non-pregnant
Normal	≥ 23.0cm	≥ 21.0cm
GAM	< 23.0cm	< 21.0cm
Severe wasting	< 20.7cm	< 18.5cm

2.2.7. Questionnaire, training and supervision

2.2.7.1. Questionnaire

The standard nutrition survey questionnaire as developed through the Nutrition Information Working group (NIWG) was used for data collection during the survey.
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. Findings from the pre-test were used to modify the questionnaire accordingly. The pilot area was not included in the clusters to be surveyed.

[11] The SPHERE Project Handbook (2004). Humanitarian Charter and Minimum Standards in Disaster Response.

2.2.8. Survey teams and supervision

The survey was executed by 6 teams each comprising of 1 team leader and 2 anthropometric measurers and a data entry clerk since they were using phones to collect data. Three of the team leaders were from Ministry of Health (MOH), one from the National Drought management agency (NDMA) and two from Save the Children.
The survey was led and supervised by trained staff from Save the Children. 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 and the Nutrition Coordinator from Save the Children.

2.2.9. Training

Training for the survey teams was undertaken by Save the Children staff (the nutrition M&E specialist). The training was undertaken for 4 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 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. Areas of weakness observed during the standardization test were strengthened to improve the quality of data collection.

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. The pretest was also conducted to assist the enumerators to familiarize themselves more with the data collection process and to conduct the anthropometric measurements.

2.2.10. Data analysis

Anthropometric and mortality data entry and processing was done using the ENA for SMART software 2011 16th November 2013 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 SMART/ENA software generated weight-for-height, height-for-age and weight-for-age Z scores to classify them into various nutritional status categories using WHO 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 collected using tablets and the output was in excelled but analysis was in the EPIINFO 3.5.4 version.

3.0. 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)

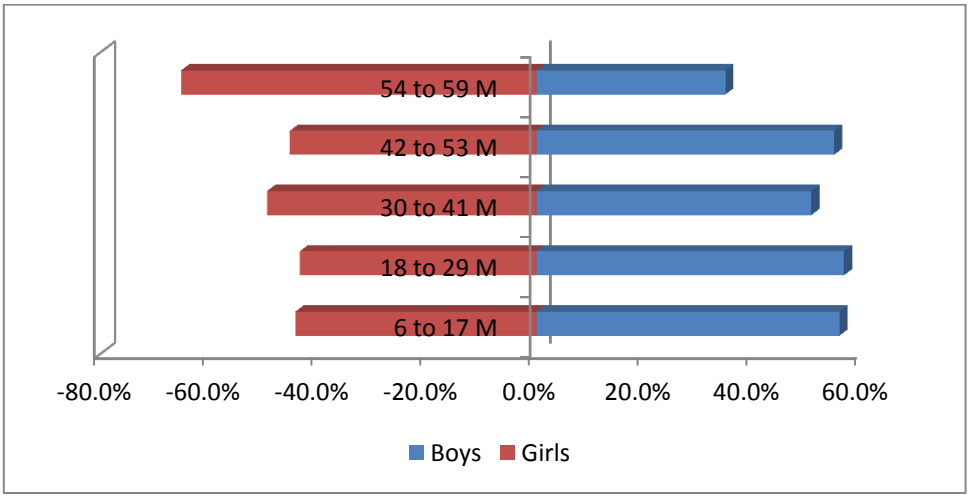
Exclusion of z-scores from Observed mean SMART flags: WHZ -3 to 3; HAZ -3 to 3; WAZ -3 to 3

Table 8: Distribution of age and sex of sample

	Boys		Girls		Total		Ratio
AGE (mo)	**no.**	**%**	**no.**	**%**	**no.**	**%**	**Boy: girl**
6-17	82	55.8	65	44.2	147	22.2	1.3
18-29	90	56.6	69	43.4	159	24.0	1.3
30-41	89	50.6	87	49.4	176	26.5	1.0
42-53	74	54.8	61	45.2	135	20.4	1.2
54-59	16	34.8	30	65.2	46	6.9	0.5
Total	351	52.9	312	47.1	663	100.0	1.1

The overall sex ratio was 1.03 (p-value = 0.784) indicating that both boys and girls were equally represented. The overall age distribution (p-value = 0.163), meaning that there was equal representation of children 6-29 months compared to the 30 to 59 months. The same was however not true for the overall sex/age distribution with a p-value = 0.043 since there was a slight underepresentatio of boys in the 54-49 age category. Overall there was an under representation of children between the ages of 54-59 months which may be attributed to the older children movement with animals in the search for pastures and as well some of them being in school since the survey was done when schools were in session.

Figure 2: Population age and sex pyramid



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3.1.1. Prevalence of malnutrition by weight for height (wasting)

Table 9: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

	Boys n = 346	Girls n = 309	All n = 655
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(67) 19.4 % (14.7 - 25.1 95% C.I.)	(43) 13.9 % (10.7 - 17.9 95% C.I.)	(110) 16.8 % (13.9 - 20.2 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(55) 15.9 % (11.7 - 21.2 95% C.I.)	(35) 11.3 % (8.3 - 15.2 95% C.I.)	(90) 13.7 % (11.1 - 16.8 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(12) 3.5 % (1.9 - 6.1 95% C.I.)	(8) 2.6 % (1.4 - 4.7 95% C.I.)	(20) 3.1 % (2.0 - 4.7 95% C.I.)

The prevalence of oedema is 0.0 %

Table 10: 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	145	5	3.4	20	13.8	120	82.8	0	0.0
18-29	157	5	3.2	14	8.9	138	87.9	0	0.0
30-41	174	4	2.3	27	15.5	143	82.2	0	0.0
42-53	134	2	1.5	22	16.4	110	82.1	0	0.0
54-59	45	4	8.9	7	15.6	34	75.6	0	0.0
Total	655	20	3.1	90	13.7	545	83.2	0	0.0

Table 11: 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. 25 (3.8 %)	Not severely malnourished No. 638 (96.2 %)

There were no marasmic-kwashiorkor cases. And as well no kwashiorkor cases and 25 children with marasmus encountered during the survey however.

The figure below show the weight for height distribution curves of the surveys sample in Z-scores for comparison with both the WHO reference populations. The weight for height distribution curves of the sample are shifted to the left, with a mean Z-score of -1.21±1.03, which indicates a suboptimal nutrition status compared to the reference population (WHO reference table).

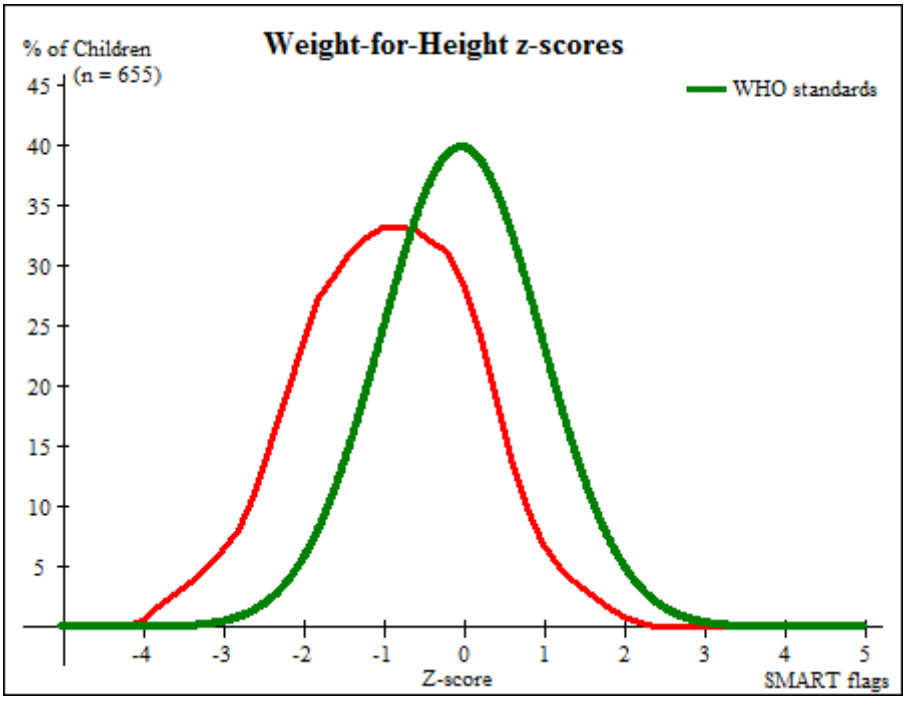


Figure 3: GAM weight for height Z-scores

3.1.2. Prevalence of malnutrition by MUAC

Table 12: Prevalence of acute malnutrition based on MUAC cut offs (and/or oedema) and by sex

	Boys n = 351	**Girls** n = 312	**2014** n = 663	**2013** n=447	**Significance**
Prevalence of global malnutrition (< 125 mm and/or oedema)	(20) 5.7 % (3.4 - 9.4 95% C.I.)	(26) 8.3 % (5.7 - 12.1 95% C.I.)	(46) 6.9 % (5.0 - 9.6 95% C.I.)	3.6(2.1-5.9 95%CI)	P=0.025 (significant)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	(11) 3.1 % (1.6 - 6.1 95% C.I.)	(19) 6.1 % (3.6 - 10.0 95% C.I.)	(30) 4.5 % (3.0 - 6.8 95% C.I.)	13) 2.9 % (1.6 - 5.1 95% C.I.)	P=0.197
Prevalence of severe malnutrition (< 115 mm and/or oedema)	(9) 2.6 % (1.3 - 5.1 95% C.I.)	(7) 2.2 % (1.1 - 4.6 95% C.I.)	(16) 2.4 % (1.5 - 3.9 95% C.I.)	0.7 (0.1-3.0 95%CI)	P=0.54

There was an increase in malnutrition (GAM) by MUAC from 3.6% in 2013 to 6.9% in 2014 which was statistically significant (p=0.025). This was however not true for moderate and severe acute malnutrition as shown in the table above. On looking at the malnutrition by age groups compared to last year there was an increase of older children (30-59 months) found to be malnourished by MUAC (14) compared to last year when no children in that category were found to be malnourished by MUAC

Table 13: Prevalence of acute malnutrition by age, based on MUAC cut offs 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	147	4	2.7	19	12.9	124	84.4	0	0.0
18-29	159	3	1.9	6	3.8	150	94.3	0	0.0
30-41	176	5	2.8	4	2.3	167	94.9	0	0.0
42-53	135	3	2.2	0	0.0	132	97.8	0	0.0
54-59	46	1	2.2	1	2.2	44	95.7	0	0.0
Total	663	16	2.4	30	4.5	617	93.1	0	0.0

3.1.3. Prevalence of Acute malnutrition (Underweight and Stunting)

Compared to the same time last year, there was no statistical change in the levels of underweight and stunting reported at 11.5% (7.8-16.7) in 2013 and 14.1% (11.9-16.8) in 2014 p=0.183 and 8.1%(4.7-13.8) in 2013 and 11.1%(8.9-13.8) 2014 p=0.253 respectively.

3.1.3.1. Underweight

Table 14: Prevalence of underweight based on weight-for-age z-scores by sex

	All n = 658	**Boys** n = 348	**Girls** n = 310
Prevalence of underweight (<-2 z-score)	(93) 14.1 % (11.9 - 16.8 95% C.I.)	(55) 15.8 % (12.4 - 19.9 95% C.I.)	(38) 12.3 % (9.4 - 15.9 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(80) 12.2 % (10.0 - 14.8 95% C.I.)	(50) 14.4 % (11.4 - 17.9 95% C.I.)	(30) 9.7 % (7.1 - 13.1 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(13) 2.0 % (1.3 - 3.1 95% C.I.)	(5) 1.4 % (0.6 - 3.3 95% C.I.)	(8) 2.6 % (1.4 - 4.8 95% C.I.)

Table 15: 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	147	1	0.7	15	10.2	131	89.1	0	0.0
18-29	158	3	1.9	18	11.4	137	86.7	0	0.0
30-41	174	6	3.4	22	12.6	146	83.9	0	0.0
42-53	133	2	1.5	20	15.0	111	83.5	0	0.0
54-59	46	1	2.2	5	10.9	40	87.0	0	0.0
Total	658	13	2.0	80	12.2	565	85.9	0	0.0

3.1.3.2. Stunting

Table 16: Prevalence of stunting based on height-for-age z-scores and by sex

	All n = 628	**Boys** n = 331	**Girls** n = 297
Prevalence of stunting (<-2 z-score)	(70) 11.1 % (8.9 - 13.8 95% C.I.)	(45) 13.6 % (10.2 - 17.8 95% C.I.)	(25) 8.4 % (5.9 - 11.9 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(55) 8.8 % (7.0 - 10.9 95% C.I.)	(34) 10.3 % (7.6 - 13.7 95% C.I.)	(21) 7.1 % (4.7 - 10.5 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(15) 2.4 % (1.4 - 4.1 95% C.I.)	(11) 3.3 % (1.7 - 6.2 95% C.I.)	(4) 1.3 % (0.5 - 3.5 95% C.I.)

Table 17: Prevalence of stunting by age based on height-for-age z-scores

		Severe stunting (<-3 z-score)		**Moderate stunting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**	
Age (mo.)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	138	3	2.2	9	6.5	126	91.3
18-29	148	3	2.0	23	15.5	122	82.4
30-41	165	4	2.4	15	9.1	146	88.5
42-53	132	4	3.0	6	4.5	122	92.4
54-59	45	1	2.2	2	4.4	42	93.3
Total	628	15	2.4	55	8.8	558	88.9

Table 18: 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	655	-0.93±1.07	1.15	0	8
Weight-for-Age	658	-0.91±1.01	1.00	0	5
Height-for-Age	628	-0.53±1.23	1.00	0	35

* contains for WHZ and WAZ the children with edema.

3.1.4. Mortality results (retrospective 114 days prior to interview)

Table 19: Mortality rates

Indicator	2012 (Wajir South)	2014 (95% CI)

CMR(Total deaths/10,000 people/day(95%CI)	0.34(0.16-0.70)	0.26(0.14-0.49) D.Effect:1.00
UMR(deaths in children under five/10,000 children under five/ day: (95% CI)	0.50(0.15-1.68)	0.43 (0.13-1.38) D.effect1.34

The reported causes of death for under-fives (4 cases) were:

a) 2- Malaria
b) 2- Unknown

The reported causes of death for adults (6 cases) were;

c) 5-Unknown
d) 1-Cancer

The mean household size is calculated as 5.8 (mode =6, range 1-17)

3.1.5. Children's morbidity

3.1.5.1. Symptoms prevalent 2 weeks prior to the survey

Of 743 children 0-59 months 214 were reported to having been sick 2 weeks prior to the survey. This represented 28.8% of children. This compared to 43.8% reported in 2014. However we cannot relate these two directly since last year only children 6-59 months were captured. The figure below shows the commonly reported illnesses two weeks prior to the survey. Compared to last year there was a drop in ARI incidences and an increase in diarrhoea and fever with chills. This could be attributed to water scarcity as a result of sporadic long rains which may have led to compromised hygiene practices by the communities. . The trends of increased diarrhoeal cases were also confirmed in the DHIS data.

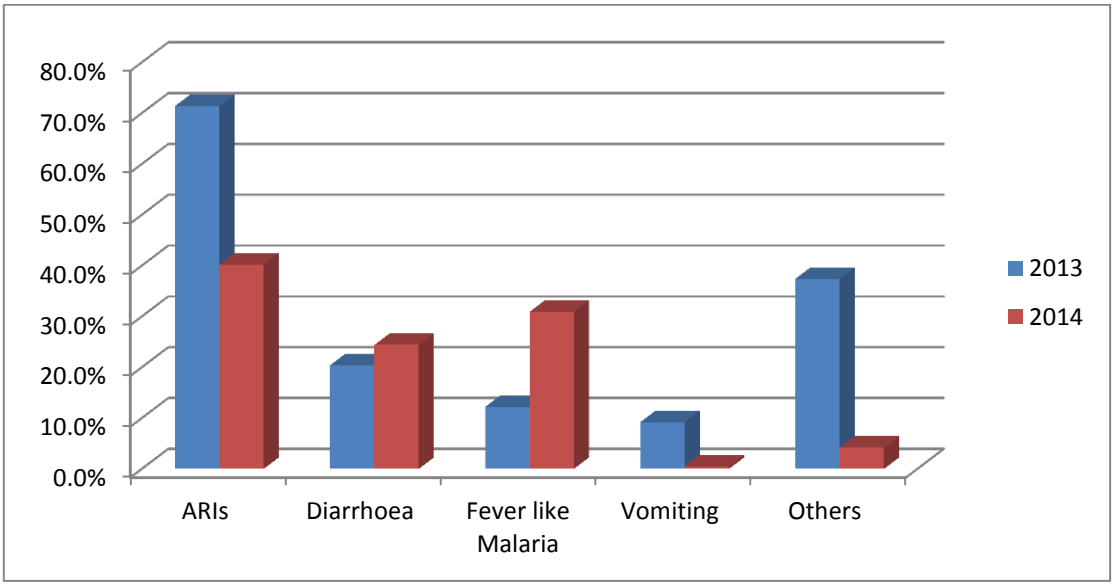


Figure 4: Symptom breakdown in the children in the two weeks prior to interview (n=214)

3.1.5.2. Health seeking practices

Of the children reported to have been sick about 77% sought care from either public clinic or outreaches provided in the hard to reach areas. Worrying however was the increase

compared to last of mothers who did not seek care when their children were sick reported at 23.7% compared to 9.2% last year as shown in figure 5 below. This could be attributed to mothers trekking long distance in search of water for domestic use leaving them with no time to seek treatment for their children. However the number of outreach sites had been scaled down in 2013 hence some children may have missed treatment as medical camps for those areas was carried out once in a month.

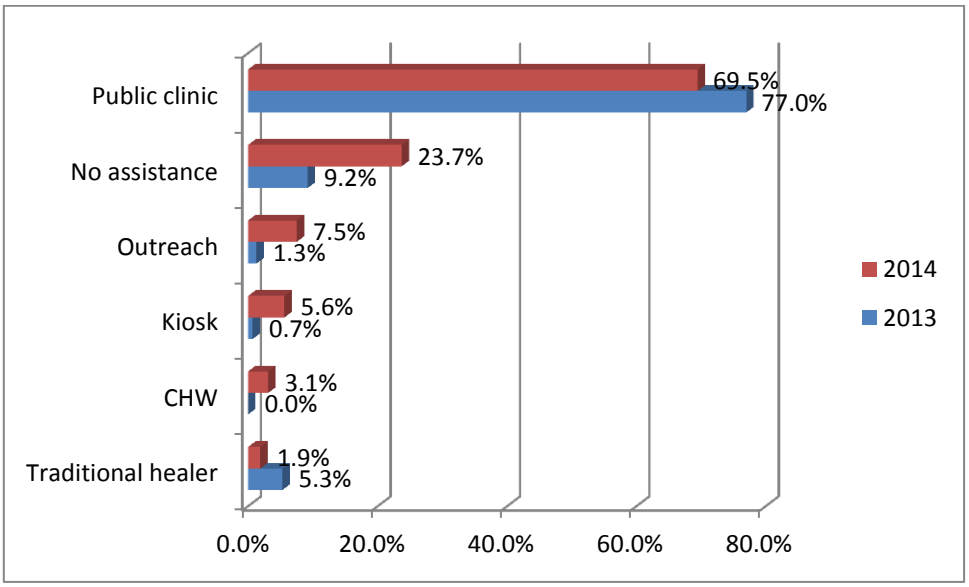


Figure 5: health seeking behaviour

3.1.6. Vaccination Results

Immunization was above the national target of >80% for all antigens reported at 91.1% for BCG scar, 82.8% for measles both by card and recall, 88.9% for OPV 1 both by card and recall and 83.7% for OPV3 by card and recall as shown in the figure below. The trends showed a drop on immunization verified by card for measles, OPV 1 and 3 compared to last year and an increase in children who were reported to not have been immunised. This could be associated to the insecurity as a result of inter-clan clashes between May and July 2014 that saw families migrate from their homes leaving their belongings (including the child welfare cards) behind

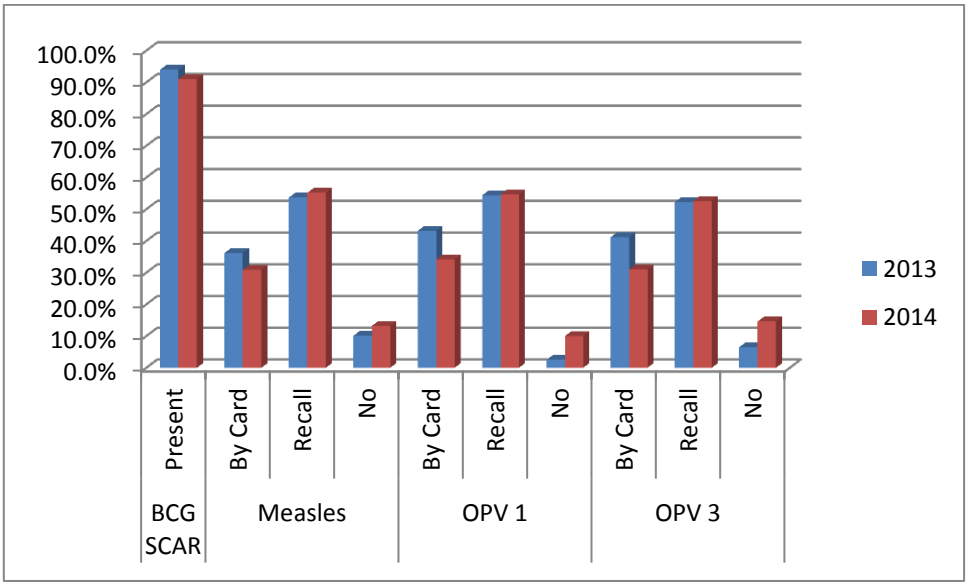


Figure 6: Vaccination coverage: BCG for 0-59 months and measles for 9-59 months

3.1.6.1. Vitamin A supplementation and Deworming

51.7% of the caretakers with children 6-11 months reported to have received the VAS at health facility. For the 12-59months 55.8% of children reported to having received VAS, in the previous year.

Table 20: Vitamin A supplementation and Deworming

	Factor	May 2013	June 2014
Vitamin A supplementation (6-11 months) N=87	**1 time**	68.1%(49)	37.9%(33)
	>1 time	4.2%(3)	13.8%(12)
Vitamin A supplementation (≥12months) N=652	**1 time**	34.4%(129)	20.4%(133)
	2 times	48.3%(181)	26.8%(175)
	>2 times	5.3%(20)	8.6%(56)
Deworming	**0 times**	31.8% (142)	58.3% (374)
	1 time	30.4% (136)	25.9%(166)
	2 times	32.2% (144)	14.7%(94)
	>2 times	-	1.1%(7)

3.1.6.2. Zinc in diarrhoea management

Compared to the previous year there was a slight reduction in zinc supplementation among the children who had diarrhoea from 30% to 23.1%. However this data should be interpreted with caution since this question was not asked to all children due to challenges when using tablets in data collection.

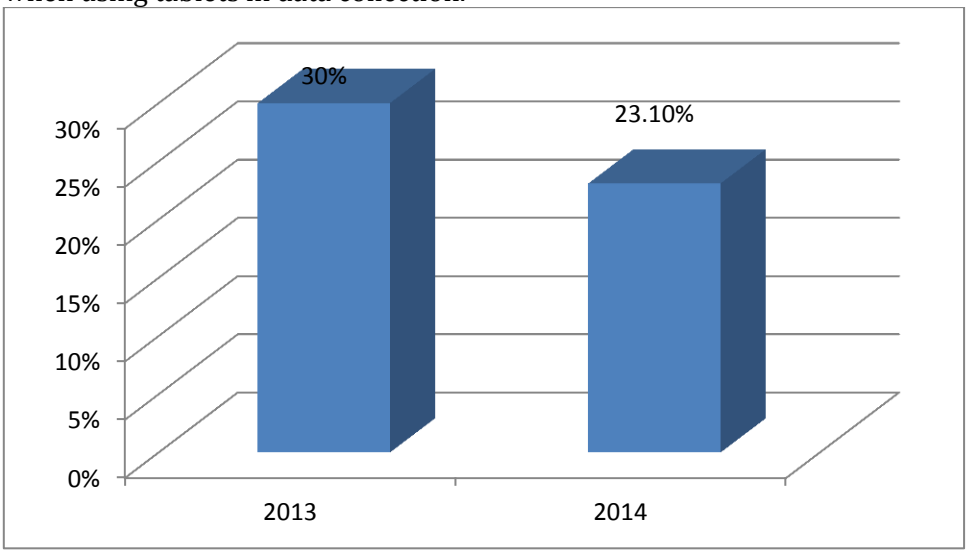


Figure 7: Zinc in diarrhoea management

4.0. DISCUSSION

4.1. Nutrition Status

The prevalence of Global Acute Malnutrition for Wajir East and South was found to be 16.8% (13.9-20.2 95%CI) and Severe Acute Malnutrition at 3.1 % (2.0 – 4.7 95% C.I.).These rates indicate deterioration in the nutrition status compared with the rates reported in a survey conducted in the district in May-June 2013 which showed a GAM of 10.5 (7.7-15.5 95% C.I). Further analysis however with the CDC calculator indicated that the change on the levels of malnutrition was statistically significant p=0.004 for GAM and P=0.022 for SAM. This was also found to be true for GAM levels by MUAC which were reported at 6.9% (5.0-9.6 95% CI) compared to last year reported at 3.6% (2.1-5.9 95% CI) with the test of significance giving a p value of p= 0.025. The changes in SAM by MUAC compared to last year were not significant reported at 2.4% (1.5-3.995% CI) compared to last year 0.7% (0.1-3.0 95% CI). The Stunting levels were recorded at 11.1% (8.9%-13.8% 95% CI) while underweight was recorded at 14.1% (11.9%-16.8 95%CI). For stunting and underweight there was no change compared to last year with the test of significance giving p values of p=0.253 and p=0.183 respectively.

4.2. Causes of malnutrition

The nutrition survey was undertaken towards the end of the long rain season. This was done so that the survey findings can form part of the long rain assessments conducted by NDMA. Malnutrition amongst children in the district were affected by the following factors:

4.2.1. Health status:

4.2.1.1. Morbidity:

Morbidity rates were reported by 28.8% of the caretakers. The main causes of morbidity reported were; acute respiratory tract infections (40.2%), fever with chills like malaria (30.9%), and diarrhoea (24.4%).

4.2.2. House Hold Food security

4.2.2.1. Dietary Diversity

43.4% of the households reported to having high dietary of more than 6 food groups out of the 16 food groups provided by FAO I however did not include condiments in my analysis so I used 15 food groups. The rest either had medium dietary diversity of between four to five food groups reported at 41.3% and low dietary diversity reported at 15.4% as shown below.

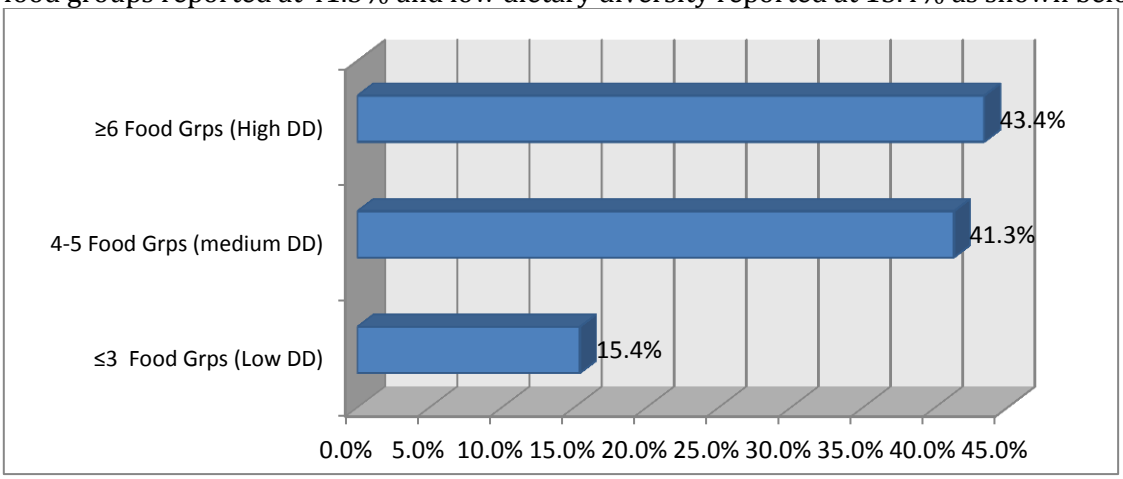


Figure 8: Dietary diversity

4.2.2.2. Food consumption score

Similarly a majority of the people reported (83.9) reported above 35 on the food consumption score with borderline and poor food consumption being reported at 8.5% and 7.5% respectively as shown in the figure below.

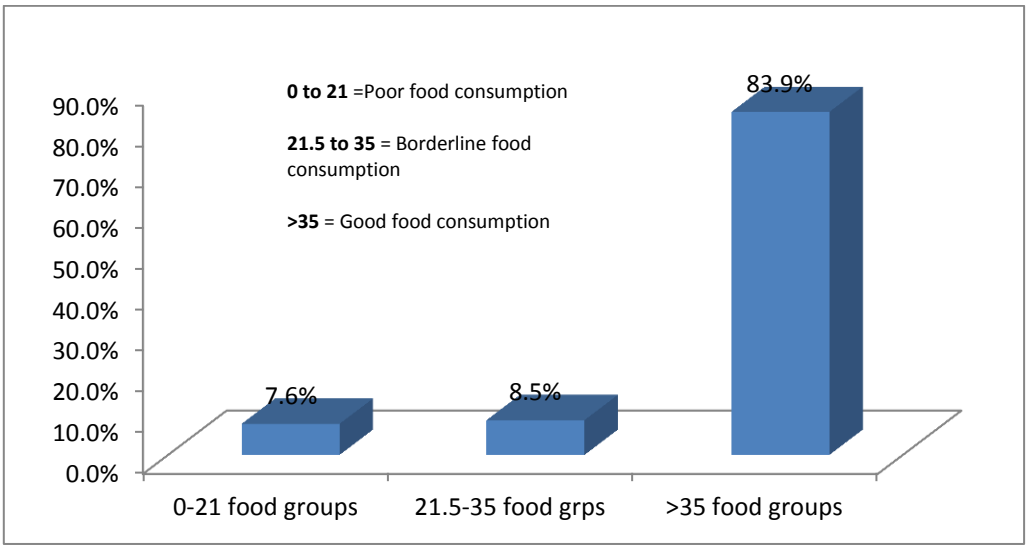


Figure 9: Food consumption score

4.2.2.3. Coping strategy index

30.9% of the respondents reported to have experienced something that affected to eat the type of foods they preferred in the previous 7 days. The table below shows an analysis of the coping strategies using the WFP coping Score Index. This showed that for all the households that had employed coping strategies in Wajir East and South on average they had a reduced CSI score of 30 which is high meaning they are employing very negative coping strategies like restriction of food for adults and as well as borrowing food in order to survive.

Table 21: Coping Strategy Index

Indicator	Raw Score	Severity weight	Weighted Score (frequency*weight)
a) Rely on less preferred and less expensive foods?	4	1	4
b) Borrow food, or rely on help from a friend or relative?	3	2	6
c) Limit portion size at mealtimes?	4	1	4
d) Restrict consumption by adults in order for small children to eat?	4	3	12
e) Reduce number of meals	4	1	4

eaten in a day?			
Total Reduced CSI for Wajir East and south (Mean)			30

4.2.2.4. HH main livelihood activities

The main livelihood activity for most of the HHs interviewed was Livestock herding (43.4%). This was followed waged labour (25.4%) and petty trade (11.2%) with some cases of firewood and charcoal sale (7.4%) and some salaried people (6.7%) especially in the urban centres. The main sources of income for the HH was reported as mainly sale of livestock (31.6%), casual labour (23.8%), petty trade (20.7%), among others as shown in figure 10 and 11 below;

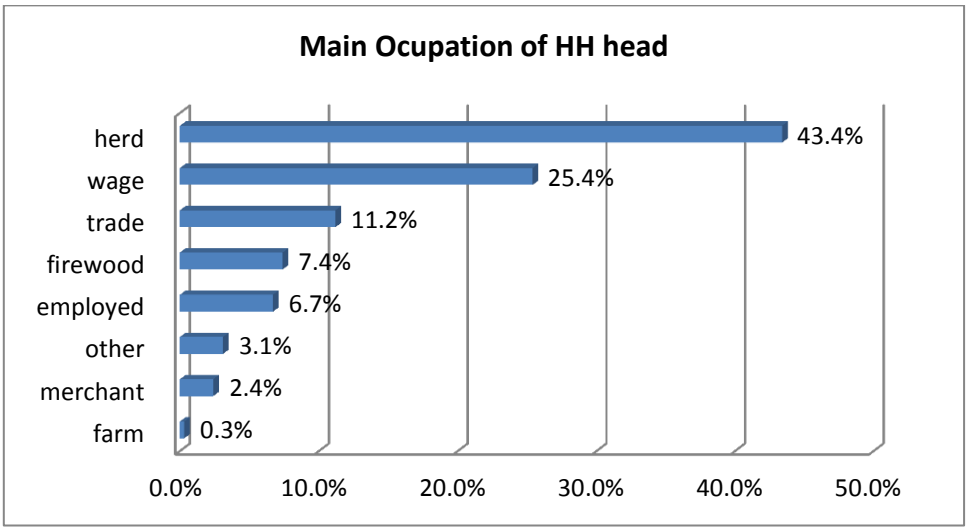


Figure 10: Main HH livelihood activity

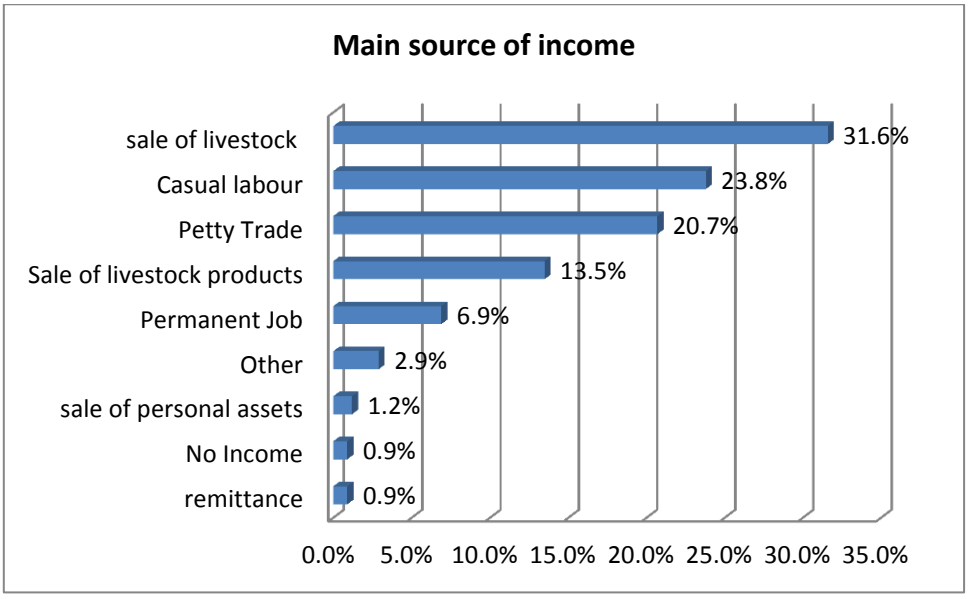


Figure 11: Main Sources of income

4.2.3. Water and Sanitation

4.2.3.1. Main water source

Most of the respondents reported to getting their water from unsafe sources (60.6%). The most reported sources were however piped water (37.8%) followed by unprotected well (36.1%) and earth pan (24.5%). Majority of the respondents reported to taking less than an hour to get to the water source, with 41% taking 15 minutes while 53.4% taking between 15 minutes and an hour. Most (78.2%) did not queue for water

51.1% paid for their water amount ranging from two to fifty shillings. The majority (53.3) reported to paying 5 shillings for a 20 litre Jerri can. In addition 59.4% of the respondents reported to storing their water in closed containers. One average the respondents reported to use 13.8 litres of water per person almost the recommended 15 Litres per day but not quite there. 51.8% of the respondents did not queue for water. The figure below shows the main water sources in the sub county;

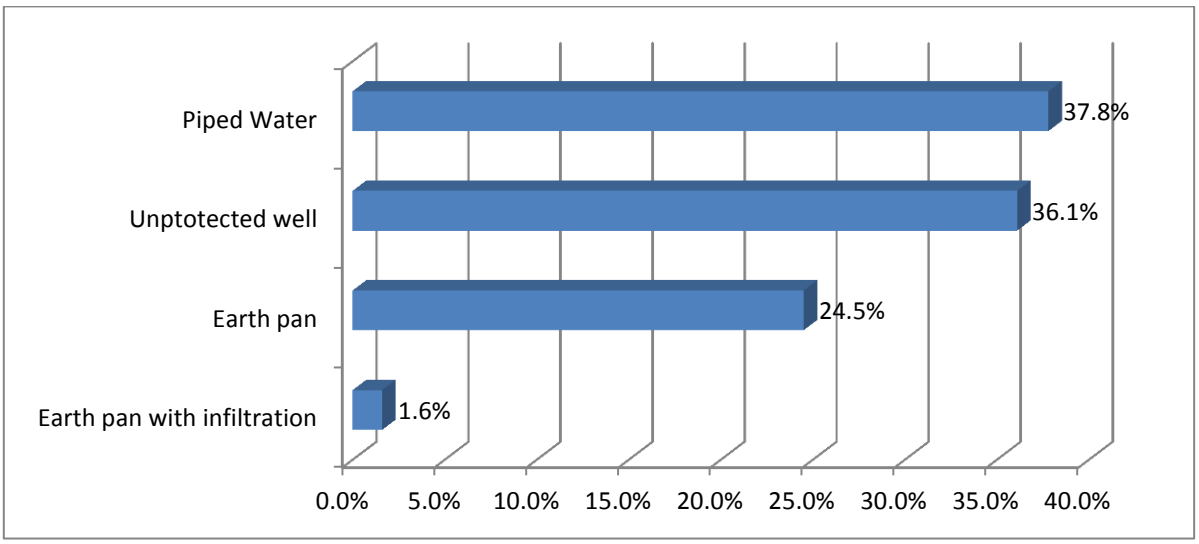


Figure 12: Main current water sources

4.2.3.2. Water treatment

Though more than a third of the respondents reported to having used water from unsafe sources , most respondents reported to not doing anything to their drinking water (94%) which was an increase from last year 71.3%. Of those who did anything to their water, most used chemicals reported by 4.3% of all households and boiling reported by1.6% of all the respondents there were a few who also reported to filtering their water as shown in the figure below;

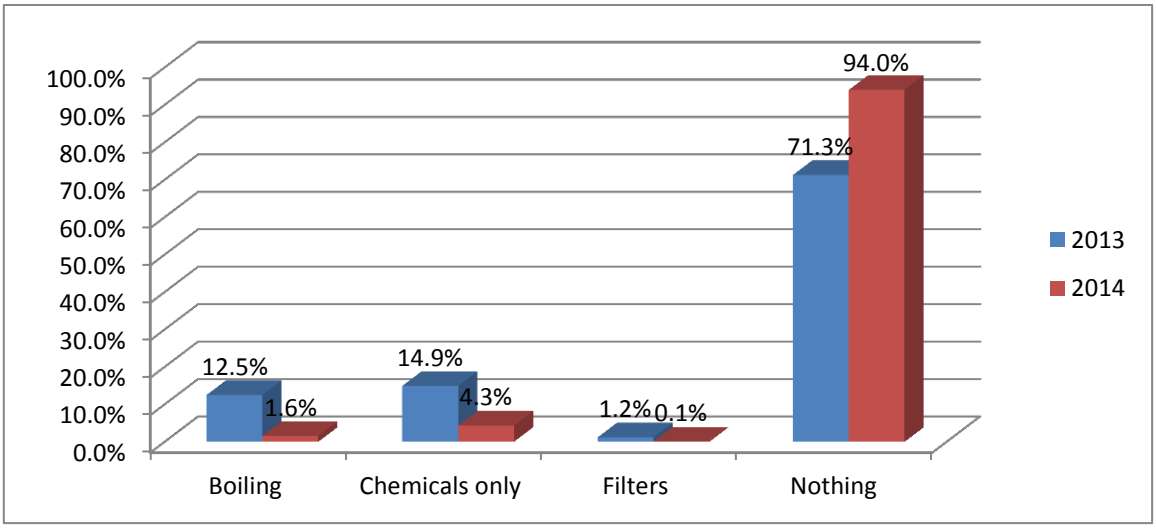


Figure 13: Treatment given to drinking water

4.2.3.3. Hand washing at critical times

More than two thirds of the population reported to have washed their hands at the most critical times (more than 60%) for all the critical times). There was a an increase in hand washing especially after cleaning baby bottoms compared to last year as shown in figure 14 below;

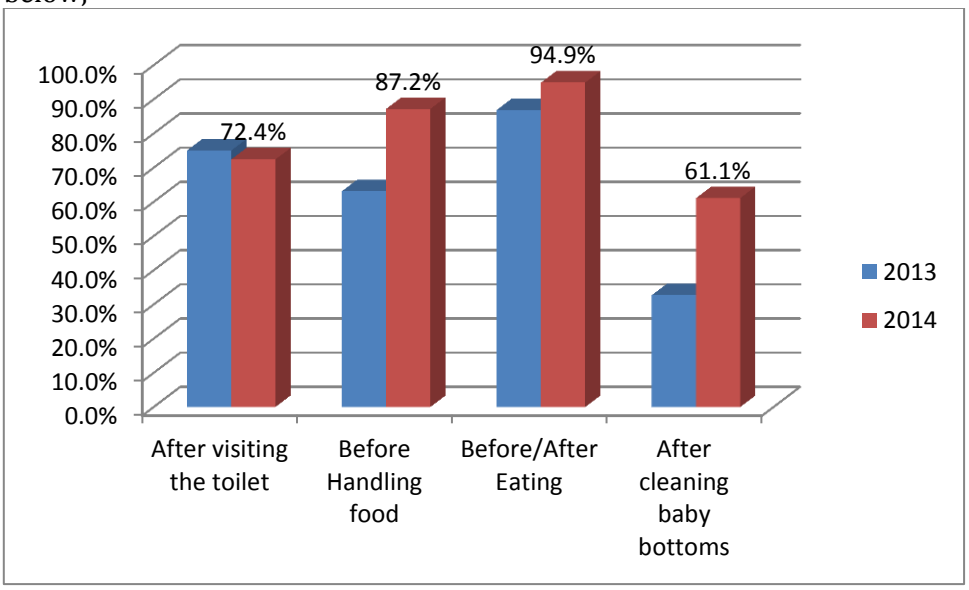


Figure 14: When hands were washed

4.2.3.4. Appropriate hand washing

Though a substantial number of people washed hands it is worth noting that most of them used water only (74%). This unfortunately is an increase from last year reported at 34.6% which could be attributed to poor purchasing power for soap and other non-food items as a result of prolonged dry spell that led to reduced animal production.

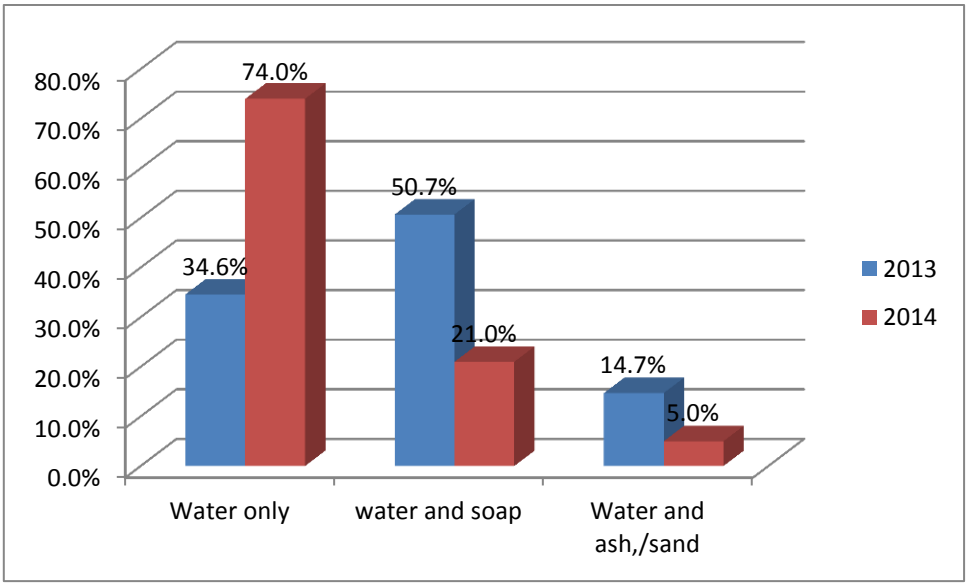


Figure 15: what was used to clean hands

4.2.3.5. Access to toilet facilities

57% of the respondents reported to have access to a toilet facility (either their own or a neighbours) this was a slight improvement from last year reported at 47%. This increase could be attributed to strengthened health promotion activities such as health education, increased refresher trainings and continuous on job training on the health workers and mentorship on hygiene promotion which had in turn positive impact on the beneficiaries. The families that did not have access to a toilet facility reported to relieving themselves in the bush as shown in the figure below. This indicates poor human waste disposal methods that have the potential to contaminate the open water sources like earth pans and unprotected wells (which are common water sources in the sub county) leading to diarrhoea and other water borne diseases.

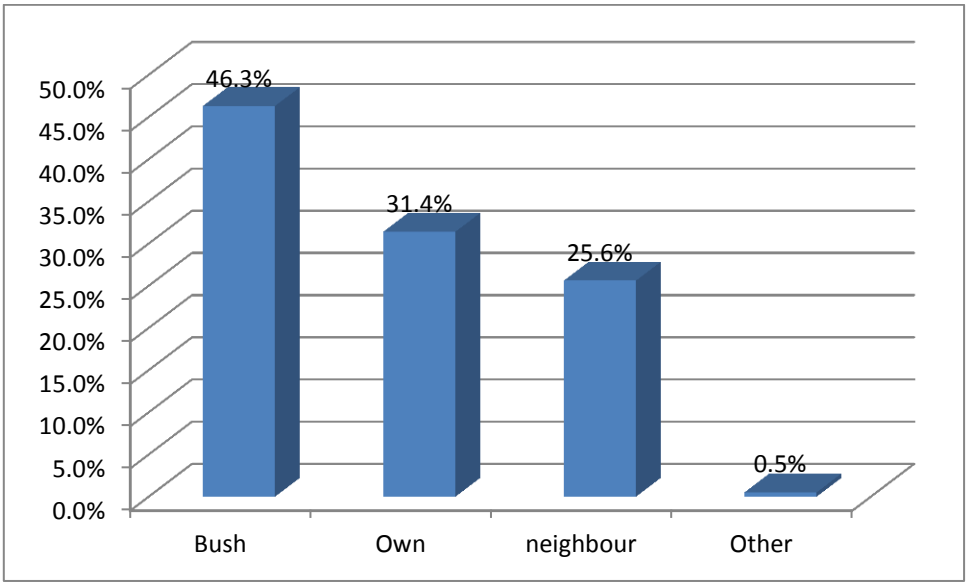


Figure 16: Access to toilet facilities

4.3. Maternal Indicators

4.3.1. Physiological status

Most mothers were lactating (43.6%) followed by 43.4 who were neither pregnant nor lactating. A smaller proportion (13.1%) was pregnant at the time of the survey.

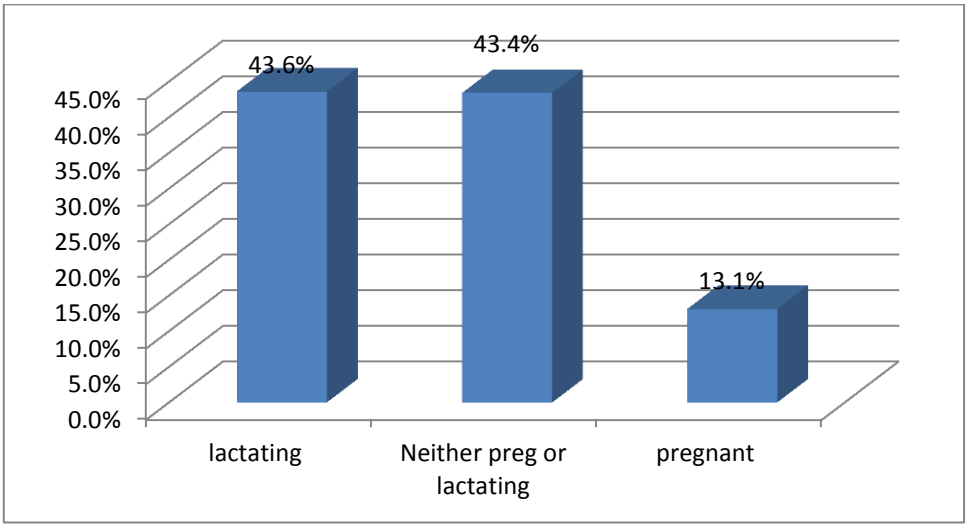


Figure 17: Physiological status

4.3.2. Women of reproductive age MUAC information

There was a decrease in malnutrition by MUAC for the pregnant and lactating women from 19.5% in 2013 to 4.65% in 2014. This was also similar to all women 15-49 years which reduced from 11.8% to 7.2%. However interpretation should be with caution since this year the all women in all the HH visited that were between 15-49 years had their MUAC taken while last year only caretakers MUAC was taken and therefore the sample size was higher this time.

Table 22: MUAC women 15 to 49 years

	Physiological status	MUAC <21 cm	MUAC >21 Cms
2014	PLWs (344)	4.65%	95.40%
	All Women 15 – 49 years (594)	7.20%	92.80%
2013	PLWs	19.50%	80.50%
	All Women 15 – 49 years	11.80%	88.20%

4.3.3. Iron and Folic Acid Supplementation and utilization

4.3.3.1. Iron supplementation

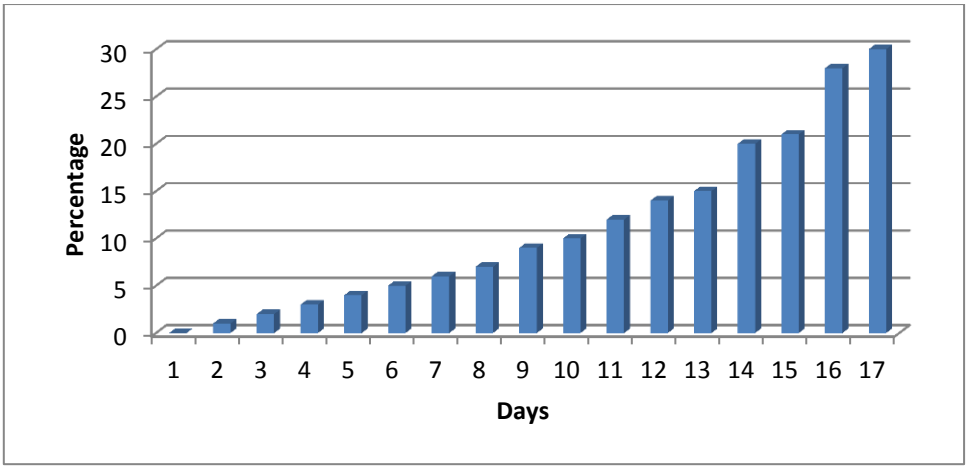
Iron supplementation in in the two sub counties reduced from 46.7% to 31.3%. this could be attributed to the new data collection tools agreed upon by the nutrition sector which changed the way the question was asked (last year was asking for supplementation for the women who were pregnant at the time of the survey while during this survey we were asking for all the children who were 24 months) so again the sample size was higher.

Table 23: Iron Folate supplementation

Iron Supplementation	Factor	Wajir South and East May 2013		Wajir South and East June 2014	
		No	%	No.	%
Supplemented with Iron	Yes	28	46.7%	83	31.3%

4.3.3.2. No of days that iron supplements were taken

Of those who reported to have been supplemented with iron the majority only took the supplements for an average of 17 days (30%). This against a recommendation of 270 days (the entire gestation period) as shown in table 12 and figure 10 below;



4.4. Other HH Indicators

4.4.1. Status of the HH

Most of the households (99.5%) reported to being residents of clusters visited with only three respondents being internally displaced. This was following the interclan conflicts in 2014 forcing the three to move (one from Tarbaj and two within Wajir central). Most of the respondents (92.1%) were married at the time of the survey with the remainder either being widowed, divorced single or separated.

4.4.2. Nets availability and usage

Most of the households (63%) reported to not having any mosquito nets compared to 37% with nets as shown below.

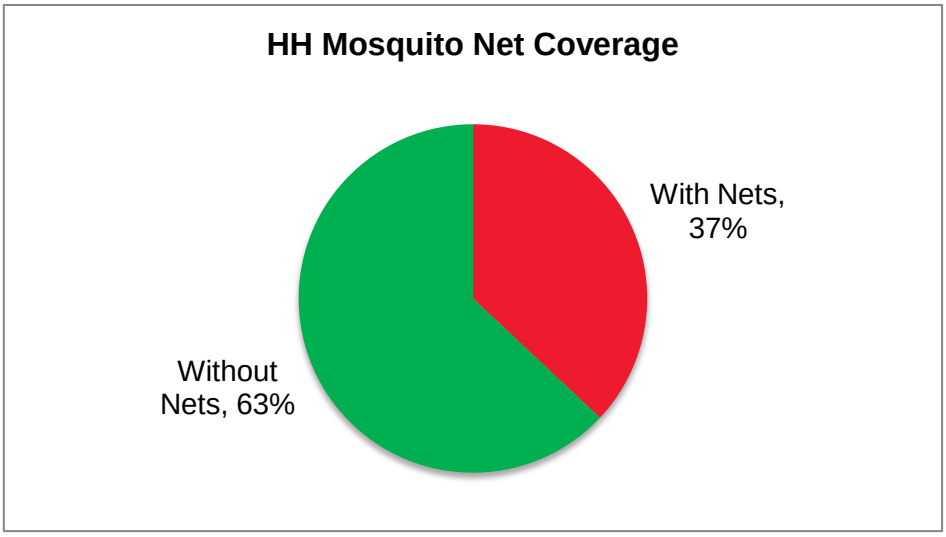


Figure 18: Mosquito nets availability

4.4.3. Highest level of education attained

Most people (60.1%) reported to not have attained any level of education with also a considerable number only reporting to have only completed pre-primary level of education (29.9%)

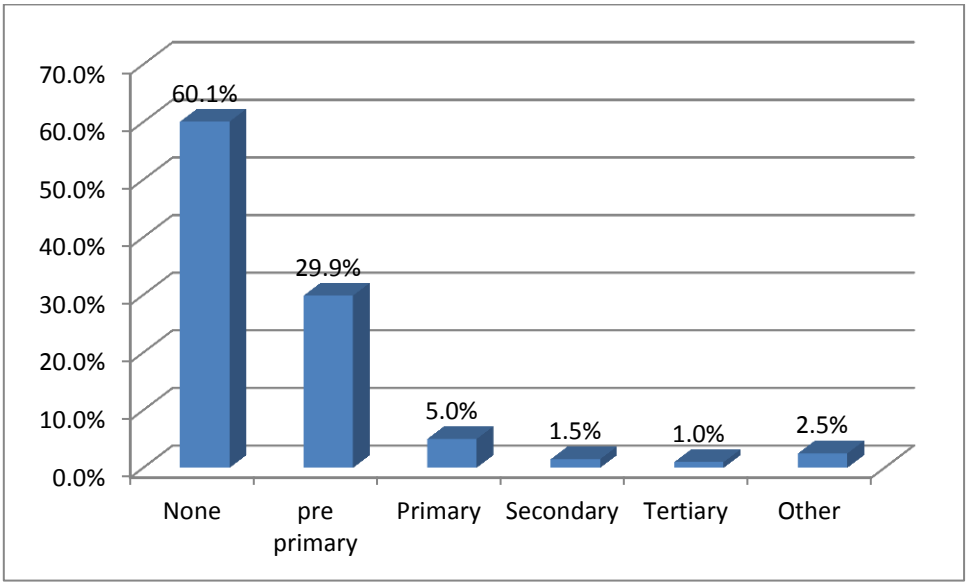


Figure 19: Highest level of education

5.0. CONCLUSIONS AND LIMITATIONS

- There is an increase in GAM rates 2014 from 10.5(7.9-13.9) in 2013 to 16.8 (13.9-20.2).Further analysis of the Wajir results with the CDC calculator indicates a 0.004 probability (99.6%) that the prevalence rates in the June 2014 survey were higher than those of June 2013 hence indicating a worsened nutrition situation.

- Acute respiratory diseases remain the major morbidity among children under the age of five years however there was an increased in cases that reported fever with chills like malaria from 12.2% in 2013 to30.9% in 2014.

- 77% of the respondents with sick children reported to having sought care when their children were sick. There was an increase however of caretakers who did nothing when their children were sick from 9.2% in 2013 to 23.7% in 2014

- Micronutrients and deworming remains low with children dewormed twice in the previous year reported at 32.2%, Vitamin A supplementation twice for the children 12-59 Months reported at 52.6% and at 72.6% once among the children 6-11 months.

- Iron Folate supplementation among the pregnant women was reported at 46.7% and even this was an increase from last year's 31.3%, it is still below the national target of 80% and above. Of concern as well is that even if the recommended utilization period currently is 270 days a majority of the women who had children less than 24 months (30%) had only consumed the iron folate supplements for 17 days.

- The number of households still not treating water remains high despite health and hygiene promotion and distribution of water treatment chemicals at the community level

- There was good immunization coverage of above 80% on all antigens , though high coverage was through recall

- Good utilization of LLITNs by the under-fives (62%), with low Percent reported to have ever treated it. However it will be important to monitor usage throughout the year.

- There is improved toilet coverage compared to last survey. This could be attributed to CLTS and hygiene promotion.

- Water treatment coverage is still low. Need to explore further on why the community Hygiene education along this intervention

LIMITATIONS

- 11 out of 113 villages were excluded from the sampling frame due to insecurity concerns. this sites were Berjanai, Dunto, Basanicha, Sarman, Gunana, Elben, Mansa, Burmayo, Abdi Caaney, Durwaya and Orgoralle

- For the MUAC data for the women of child bearing age the sampling frame was slightly differnt from last year (in last year only the respondents MUAC was taken while this year all women in HH between 15-49 years MUAC was taken)

- There was one child who was disabled and therefore their anthropomentric data was not taken

6.0. RECOMMENDATIONS AND PRIORITIES

Table 24: Recommendations

Issues	Possible causes	Recommendations	By who
High malnutrition rates among <5s and women of reproductive age(WRAs)	-Inter clan conflicts -failure of long rains leading to prolonged dry spell -Poor dietary diversity -Training gap for the HWs on Growth monitoring. -Inadequate of infant and Bathroom scales for growth monitoring for children <6 months	-Increase the coverage of health and nutrition outreach activities to all the sites which are not included in the current coverage of services. -Conduct monthly mass screening More emphasis on Birth spacing. -More cooking demonstration sessions. -Encourage mothers to join Care support groups for moral support -Strengthen growth monitoring -procure bathroom and infant weighing scales. -Need to explore further on other possible causes.	DOH with support from partners

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 promotion on water treatment and storage.	DOH with support from partners
Low Iron-folate supplementation	-Insufficient counseling to mothers during ANC visits. -Poor reporting	-Counseling of mothers on importance of iron-folate supplements -More OJT and emphasis on reporting	SCHMTs & 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. -Need to explore Child Health and Sanitation Trainings (CHAST) in school health clubs.	DOH with support from partners.
Low LLITNs coverage		Health promotion sessions on LLITNS use with emphasis to Children <5s and PLWs	DOH
Low Vitamin A & deworming coverage compared to national target	-Poor health education and counseling by the HFs in charges. -Poor reporting due prescription	-Sensitizing the ECD teachers and maalim Duksis on importance Vitamin A supplementation and De-worming and modes of administration and link to the ECDs/ Duksis and health facilities -Use of Monitor charts for the health facilities. -Health education when supplementing. -Explore options of using Mother and child heath booklet to record the supplements. Increased OJT on reporting and emphasis on importance	DOH with support from partners
High diarrheal diseases	-Population displacement that leads to lack of portable water -Poor health education and interference of the livelihood systems which most of the population were	Early warning signs and contingency plans should be developed to inform the upcoming disasters like conflicts, droughts etc. in good time so that in the event of a disaster the plan is only to be activated.	NDMA/partners and DOH

dependent on.

7.0. REFERENCES

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- The sphere project 2011, Humanitarian charter and Minimum standards
- National Centre for Health Statistics (1977) growth curves for children 0-18 yrs.
- Kenya nutrition survey guidelines 2012
- Coping Strategies Index: Field Methods Manual. Copyright © 2008 Cooperative for Assistance and Relief Everywhere, Inc. (CARE).
- 2013 SMART Nutrition Survey, Wajir East and South sub-counties
- 2014 NDMA Long rain Assessment, Wajir County
- Wajir County Health Sector Strategic Planning, 2013/14-2017/18

8.0. APPENDICES

8.1. Appendix 1: Plausibility Report

Overall data quality

Criteria	Flags*	Unit	Excel.	Good	Accept	Problematic	Score
Missing/Flagged data (% of in-range subjects)	Incl	%	0-2.5 0	>2.5-5.0 5	>5.0-7.5 10	>7.5 20	**0** (1.2 %)
Overall Sex ratio (Significant chi square)	Incl	p	>0.1 0	>0.05 2	>0.001 4	<=0.001 10	**0** (p=0.130)
Overall Age distrib (Significant chi square)	Incl	p	>0.1 0	>0.05 2	>0.001 4	<=0.001 10	**4** (p=0.003)
Dig pref score - weight	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	**0** (3)
Dig pref score - height	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	**2** (8)
Dig pref score - MUAC	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	**0** (4)
Standard Dev. WHZ .	Excl	SD	<1.1 And	<1.15	<1.20 or	>=1.20	
.	Excl	SD	>0.9 0	>0.85 2	>0.80 6	<=0.80 20	**0** (1.07)
Skewness WHZ	Excl	#	<±0.2 0	<±0.4 1	<±0.6 3	>=±0.6 5	**0** (-0.07)
Kurtosis WHZ	Excl	#	<±0.2 0	<±0.4 1	<±0.6 3	>=±0.6 5	**1** (-0.28)
Poisson dist. WHZ-2	Excl	p	>0.05 0	>0.01 1	>0.001 3	<=0.001 5	**0** (p=0.501)
Timing	Excl	Not determined yet 0		1	3	5	
OVERALL SCORE WHZ =			0-9	10-14	15-24	>25	**7** %

The overall score of this survey is 7 %, this is excellent

8.2. Appendix 2: Assignment of Clusters

Table 25: Clusters assigned

Geographical unit	Population size	Cluster	Geographical unit	Population size	Cluster
Barwaqo	3411	1	Dasheq	5819	21
Kalkacha	2558		Wargadud	3840	22
Bagdad	853		Hungai	6745	23
Bangal	853		Kajaja1	2372	
Bulla Hewa	853		Kajaja2	2372	
Wagberi1	2107	2	IbrahimUre	4199	24
Wagberi2	2107		Gerille	2220	
Bulla Kom	1580		Handaki	2028	
Maalim Salad	1580		Diff	9825	25,26

Lanbib	1053	3	Salalma	4322	
Abdiaziz	1053		Hubsoy	543	
Meigag	1053		Gulletderre	2442	
Hodhan	2878		Burder	4909	27
Shalete	2878	4	Macheza	4298	28
Godrahma	1918		Kursin	3911	
Bulla Majina	1918		Qoqar	286	
Jogoo	7127	5	Arablow	973	
Bulla Isiolo	2086		Leheley	8040	29
Makoror	8575	6	Boji Yareh	642	
God- Ade	6994	RC	Eyrib	2915	30
Bulla power	5595	7	El-Adow	3490	
Halane	1399		Kulaaley	11066	31,32
Township	7699	8	Dadajabulla	9067	33
Alimao	4466	RC	Sarif	6084	34
Bulla Gadud	1117		Banane	3644	
Tarbaj	11827	9	Sala	1773	
Haragal	1690	10	Shidley	695	35
Katote	3379		Shimbir Bul	2448	
Dambas	9426	11	Dagahaley	5808	36
JaiJai	1047	12	Sabule	4015	
Hassan Yarrow	1252		Junction	592	
Elben	12721	13	Finni	852	
Berjanai	4781	14	Lagbogol	3944	37
Mansa	10640	15	Tesorie	4407	
Sarman	8075	RC	Mathahalibah	745	
Wajir Bor	4788	RC	Karu	359	38
Arbaqaranso	2872		Ali Dumal	537	
Sitawario	957		Meri	4589	
Riba	6728	16	Abakore	7436	39
Qarsa	2883	17	Dulgub	744	
Krof Harar	11942	18	Dilmanyale	3500	RC
Kotulo	9270	19	Habaswein Central	2814	
Lafaley	3794	20	Kiwanja Ndege	4146	40
Jowhar	3502		Kibilay	3433	
Kanjara	1736		Bulla juu	774	

Geographical unit Population sizeAssigned cluster

8.3. Appendix 4: Result Tables for NCHS growth reference 1977

Table 26: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

	All n = 658	Boys n = 348	Girls n = 310
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(119) 18.1 % (15.1 - 21.5 95% C.I.)	(74) 21.3 % (16.4 - 27.1 95% C.I.)	(45) 14.5 % (11.1 - 18.8 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(105) 16.0 % (13.2 - 19.2 95% C.I.)	(66) 19.0 % (14.5 - 24.4 95% C.I.)	(39) 12.6 % (9.2 - 17.0 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(14) 2.1 % (1.4 - 3.3 95% C.I.)	(8) 2.3 % (1.2 - 4.4 95% C.I.)	(6) 1.9 % (0.9 - 4.1 95% C.I.)

The prevalence of oedema is 0.0 %

Table 27: 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	145	5	3.4	29	20.0	111	76.6	0	0.0
18-29	157	3	1.9	23	14.6	131	83.4	0	0.0
30-41	176	3	1.7	30	17.0	143	81.3	0	0.0
42-53	135	2	1.5	16	11.9	117	86.7	0	0.0
54-59	45	1	2.2	7	15.6	37	82.2	0	0.0
Total	658	14	2.1	105	16.0	539	81.9	0	0.0

Table 28: Distribution of acute malnutrition and oedema based on weight-for-height z-scores

	<-3 z-score	>=-3 z-score
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 15 (2.3 %)	Not severely malnourished No. 647 (97.7 %)

Table 29: Prevalence of acute malnutrition based on MUAC cut off's (and/or oedema) and by sex

	All n = 663	Boys n = 351	Girls n = 312
Prevalence of global malnutrition (< 125 mm and/or oedema)	(46) 6.9 % (5.0 - 9.6 95% C.I.)	(20) 5.7 % (3.4 - 9.4 95% C.I.)	(26) 8.3 % (5.7 - 12.1 95% C.I.)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	(30) 4.5 % (3.0 - 6.8 95% C.I.)	(11) 3.1 % (1.6 - 6.1 95% C.I.)	(19) 6.1 % (3.6 - 10.0 95% C.I.)
Prevalence of severe malnutrition (< 115 mm and/or oedema)	(16) 2.4 % (1.5 - 3.9	(9) 2.6 % (1.3 - 5.1	(7) 2.2 % (1.1 - 4.6

	95% C.I.)	95% C.I.)	95% C.I.)

Table 30: 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	147	4	2.7	19	12.9	124	84.4	0	0.0
18-29	159	3	1.9	6	3.8	150	94.3	0	0.0
30-41	176	5	2.8	4	2.3	167	94.9	0	0.0
42-53	135	3	2.2	0	0.0	132	97.8	0	0.0
54-59	46	1	2.2	1	2.2	44	95.7	0	0.0
Total	663	16	2.4	30	4.5	617	93.1	0	0.0

Table 31: Prevalence of acute malnutrition based on the percentage of the median and/or oedema

	n = 658
Prevalence of global acute malnutrition (<80% and/or oedema)	(64) 9.7 % (7.8 - 12.1 95% C.I.)
Prevalence of moderate acute malnutrition (<80% and >= 70%, no oedema)	(60) 9.1 % (7.2 - 11.5 95% C.I.)
Prevalence of severe acute malnutrition (<70% and/or oedema)	(4) 0.6 % (0.2 - 1.6 95% C.I.)

Table 32: 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	145	0	0.0	15	10.3	130	89.7	0	0.0
18-29	157	1	0.6	14	8.9	142	90.4	0	0.0
30-41	176	2	1.1	16	9.1	158	89.8	0	0.0
42-53	135	1	0.7	8	5.9	126	93.3	0	0.0
54-59	45	0	0.0	7	15.6	38	84.4	0	0.0
Total	658	4	0.6	60	9.1	594	90.3	0	0.0

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

	All n = 659	**Boys** n = 349	**Girls** n = 310
Prevalence of underweight (<-2 z-score)	(137) 20.8 % (17.4 - 24.6 95% C.I.)	(78) 22.3 % (18.5 - 26.8 95% C.I.)	(59) 19.0 % (15.1 - 23.7 95% C.I.)

Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(118) 17.9 % (14.9 - 21.4 95% C.I.)	(71) 20.3 % (16.8 - 24.4 95% C.I.)	(47) 15.2 % (11.8 - 19.2 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(19) 2.9 % (1.8 - 4.5 95% C.I.)	(7) 2.0 % (1.0 - 4.0 95% C.I.)	(12) 3.9 % (2.4 - 6.2 95% C.I.)

Table 34: 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	146	1	0.7	24	16.4	121	82.9	0	0.0
18-29	157	7	4.5	28	17.8	122	77.7	0	0.0
30-41	175	7	4.0	35	20.0	133	76.0	0	0.0
42-53	135	3	2.2	23	17.0	109	80.7	0	0.0
54-59	46	1	2.2	8	17.4	37	80.4	0	0.0
Total	659	19	2.9	118	17.9	522	79.2	0	0.0

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

	All n = 634	**Boys** n = 335	**Girls** n = 299
Prevalence of stunting (<-2 z-score)	(51) 8.0 % (5.6 - 11.4 95% C.I.)	(33) 9.9 % (6.3 - 15.0 95% C.I.)	(18) 6.0 % (3.8 - 9.4 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(37) 5.8 % (4.0 - 8.5 95% C.I.)	(23) 6.9 % (4.2 - 10.9 95% C.I.)	(14) 4.7 % (2.7 - 7.9 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(14) 2.2 % (1.3 - 3.8 95% C.I.)	(10) 3.0 % (1.6 - 5.5 95% C.I.)	(4) 1.3 % (0.5 - 3.5 95% C.I.)

Table 36: 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	143	2	1.4	7	4.9	134	93.7
18-29	148	2	1.4	12	8.1	134	90.5
30-41	166	5	3.0	11	6.6	150	90.4
42-53	132	4	3.0	5	3.8	123	93.2
54-59	45	1	2.2	2	4.4	42	93.3
Total	634	14	2.2	37	5.8	583	92.0

Table 37: Prevalence of overweight based on weight for height cut off's and by sex (no oedema)

	All	**Boys**	**Girls**

	n = 658	n = 348	n = 310
Prevalence of overweight (WHZ > 2)	(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 overweight (WHZ > 3)	(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.)

Table 38: Prevalence of overweight by age, based on weight for height (no oedema)

		Overweight (WHZ > 2)		**Severe Overweight (WHZ > 3)**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**
6-17	145	0	0.0	0	0.0
18-29	157	0	0.0	0	0.0
30-41	176	0	0.0	0	0.0
42-53	135	0	0.0	0	0.0
54-59	45	0	0.0	0	0.0
Total	658	0	0.0	0	0.0

Table 39: 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	658	-1.10±0.94	1.09	1	4
Weight-for-Age	659	-1.17±1.00	1.26	0	4
Height-for-Age	634	-0.37±1.23	1.67	0	29

* contains for WHZ and WAZ the children with edema.