Kilifi County SMART Survey Report

November 2016

unicef

International Medical Corps

Acknowledgement

Kilifi County SMART survey was made successful through the contribution of a number of partners. The survey was led by the County Department of Health.

The County is indebted by immense contribution by partners who tirelessly made this year's survey a success. The following partners are highly appreciated for their contribution.

- International Medical Corps for technical and financial support
- UNICEF for financial and Technical support
- European Union for financial support

Special thanks to the Kilifi County Nutrition Technical Forum and National Nutrition Information Technical Working group for their technical guidance during the survey. Last but not least the County government of Kilifi for creating an enabling environment during the data collection exercise and the Kilifi County community for taking time to provide information which will be of importance in making informed decisions in the nutrition sector programming.

List of Abbreviations

ARI	Acute Respiratory Infections
CSI	Coping Strategy Index
ENA	Emergency Nutrition Assessment
FCS	Food Consumption Score
IFA	Iron and Folic Acid
KDHS	Kenya Demographic and Health Survey
KNBS	Kenya National Bureau of Statistics
MNPs	Micro nutrients Powders
MUAC	Mid upper arm circumference
NDMA	National Drought Management Authority
OPV	Oral Polio Vaccine
PLW	Pregnant and lactating women
PPS	Proportion to population Size
SMART	Standardized Monitoring Assessment on Relief and Transition
UNICEF	United Nations Children's Fund
WASH	Water Hygiene and Sanitation
WFA	Weight for Age
WHO	World Health Organization
WRA	Women of Reproductive Age

Contents

List of Tables

List of Figures

Executive Summary

Introduction

Kilifi County department of health supported by International Medical Corps carried out a SMART survey in the entire County in November 2016. Kilifi County is located in the Kenyan Coastal region and is divided in to 7 sub counties namely; Kilifi North, Kilifi South, Rabai, Kaloleni, Magarini, Malindi and Ganze. The County has 4 main livelihood zones namely; marginal mixed farming, livestock/ranching, cash cropping/dairy farming and food cropping. The main objective of the survey was to determine the prevalence of malnutrition among the children aged 6- 59 months old, pregnant and lactating mothers in Kilifi County. Specifically the survey aimed at determining the nutrition status of children 6 to 59 months, the nutritional status of women of reproductive age (15-49 years) based on maternal mid upper arm circumference, immunization coverage; measles (9-59 months), OPV1/3 and Vitamin A for children aged 6-59months. The survey also was meant to determine deworming coverage for children aged 12 to 59 months, the prevalence of common illnesses as well to assess maternal and child health care practices, water, sanitation and hygiene practices and prevailing food security situation in the County.

Methodology

The survey was cross sectional and descriptive by design. Standardized Monitoring and Assessment on Relief and Transition methodology was be adopted in the study. The study applied quantitative approach. Two stage sampling was used in the survey. This survey applied 2 stage stratified cluster sampling method. Due to differences in drought status in different livelihood zones, the County was stratified in 2 strata. Stratum 1 (most affected livelihood zone) included, the livestock and ranching livelihood zone as well as the marginal mixed farming livelihood zone. Administratively, this stratum included 3 sub counties namely; Magarini, Ganze and Kaloleni sub counties. Stratum 2 (least affected livelihood zones) included the mixed farming and the cash cropping/dairy farming zone. Administratively stratum 2 included 4 sub counties namely; Kilifi North, Kilifi South, Malindi, and Rabai sub counties. To meet the minimum number of households, over sampling was done.

Emergency Nutrition Assessment (ENA) for Standardized Monitoring for Assessment for Relief and Transition (SMART) July 2015 was used in calculation of sample size. A minimum of 570 households were required for the survey.

The second stage sampling involved selection of households using simple random sampling method. Led by a village guide, the survey teams developed a sampling frame in each of the village sampled during the 1st stage sampling in case such a list never existed. From the list the survey teams randomly selected 16 households where they administered household questionnaire (in all households) and anthropometric, morbidity and immunization questionnaire in household with children aged 6 to 59 months.

Table 1: Results Summary table

RESULT SUMMARY				
Anthropometric Results				
WHO Standards	N	County % (95% C.I.)	Stratum 1% (95% C.I)	Stratum 2 (95% C.I)
Design effect = 1.08				
Prevalence of GAM based on WHZ (-2 z score	732	4.6% (3.3- 6.6	4.7(2.7- 8.2)	4.6(2.9- 7.3)
Prevalence of SAM based on WHZ (-3 z score) and/or edema	732	0.4(0.1-.3)	0.5 (0.1- 2.1)	0.3 (0.0- 2.3)
Prevalence of stunting based on HFA (<-2 z-score)	716	35.9(31.2- 40.9)	46(38.8- 53.3)	27.2(22.3- 32.6)
Prevalence of severe stunting based on HFA(<-3 z score)	716	12.7 (9.6- 16.7)	19.7 (14.3- 26.5)	6.8(4.2- 10.8)
Prevalence of underweight based on WFA(<-2 z score)	743	18.2(15.0- 21.9)	22.8(17.4- 29.3)	14.0(11.1- 17.5)
Prevalence of severe underweight based on WFA(<-3 z score)	743	4.2(2.8- 6.2)	5.5(3.1- 9.5)	2.8(1.5-5.2)

Child Morbidity Based on 2 weeks recall				
Indicator	Type of Illness	Kilifi County (%)	Stratum 1	Stratum 2
Illness in the last 2 weeks (Children 6-59m)	All	40.7	48.7	33.5
	Fever with Chills	34.6	36.2	32.6
	ARI	49.2	50.6	42.2
	Watery diarrhea	12.3	9.8	15.6
	Bloody diarrhea	0.6	0.6	0.7
Therapeutic Zinc supplementation during[1] diarrhea episodes		65.8		

Vitamin A Supplementation and Deworming				
Indicator	No of Times	Kilifi County (%)	Stratum 1	Stratum 2
Vitamin A Supplementation 6 to 11 months	Once	82.9	75.0	92.1
Vitamin A Supplementation 12 to 59 months	Once	70.1	55.4	88.4
Vitamin A Supplementation 12 to 59 months	Twice	47.4	31.3	61.1
Vitamin A Supplementation 6 to 59 months	Once	71.5	57.8	88.7
Deworming (12 to 59 months)	Once	60.3	47.5	71.4
	Twice	21.9	11.4	30.8

Immunization				
Antigen	Means of Verification	Kilifi County (%)	Stratum 1	Stratum 2
BCG	Presence of scar	97.0		
OPV 1	Card and Recall	97.0	93.9	97.8

[1] The number of diarrhea cases were too few to do the analysis at the stratum level

OPV 3	Card and Recall	95.9	92.5	97.1
1st Dose measles (9m)	Card and Recall	94.0	90.0	95.9
2nd Dose measles (18m)	Card and Recall	60.5	50.2	68.3
Maternal Nutrition				
Indicator	Description	Kilifi County (%)	Stratum 1	Stratum 2
MUAC< 21.0 cm	WRA	1.8	2.4	1.0
MUAC< 21.0 cm	PLW	2.1	4.2	0.7
MUAC (21.0- 22.9 cm)	WRA	7.0	10.2	5.2
MUAC (21.0- 22.9 cm)	PLW	6.6	6.1	11.5
Women supplemented with FeFo	Mothers of children aged less than 2 years	87.3	83.3	89.6
	At least 270 days	0	0	0
	At least 90 days	46.3	39.0	50.0
Average IFAS Consumption	Mean No. of days FeFo was consumed	80.0	76.2	82.4
Water Sanitation & Hygiene Practices				
Indicator	Description	County (%)	Stratum 1 (%)	Stratum 2 (%)
Households obtaining water from protected sources	All households	82.6	70.6	94.2
Households obtaining water from sources less than 500m	All Households	67.7	50.0	84.9
Households treating their water	All Households	9.3	6.7	11.8
Handwashing in 4 critical moments	Households with children under 2 years	9.0	0.5	17.9
Proportion of households that owns a toilet	All Households	50.8	42.8	58.5
Proportion of households practicing open defecation	All Households	28.9	49.5	8.8
Household and Women Dietary Diversity				
Households Consuming more than 5 food groups				
Women Consuming more than 5 food groups	All women aged 15 to 49 years	39.2	16.2	57.6
Food Consumption Score and Coping Strategy				
Household within Acceptable food consumption score (>35.5)	All Households	56.3%	56.3%	76.3%
Coping Strategy Index	Food Insecure households	32.9	39.0	32.1

Conclusion

The survey revealed high chronic malnutrition that persists in the County at 35.9%. Stratum I was most affected with a prevalence rate of 46.0% compared to stratum 2 (27.2%). There was a statistical significant difference between the two strata. In terms of acute malnutrition, Kilifi County was doing relatively good at 4.6%. There was no significant difference in prevalence of acute malnutrition in stratum I (4.7%) and Stratum 2 (4.6%) (p = 0.9522).

Some of the factors attributed to the nutrition status included morbidity. Morbidity was relatively high where at the County level 40.7% of the children were reportedly sick in the past 2 weeks prior to the survey.

There was a disparity in vitamin A supplementation at the strata level. Overall twice supplementation was low with stratum 1 performing poorer.

Overall vitamin A supplementation at the County level for children 6 to 59 months was 71.5%. Like Vitamin A supplementation, deworming of children was a notable gap where only 21.9% of children aged 12 to 59 months were dewormed twice. There was no MNP supplementation program in the County.

Maternal nutrition status by MUAC recorded impressive performance. Although majority of women were supplemented with iron and folic acid during their immediate pregnancy, very few took the tablets for the recommended 270 days.. The mean number of days for FeFo consumption was 80.3 days.

The survey also revealed a relatively good food consumption score with 66.3% of the household having acceptable FCS. However only 39.2% of the women met the minimum dietary diversity for women. At the County level, the main food groups consumed included cereals, fish, vegetables, sugar and sweets for WRA, the main food items consumed included grains, white roots and tubers, meats (especially fish) as well as dark green leafy vegetables.

Half of the households surveyed were food insecure in the past 7 days prior to the survey. Such households adopted a number of coping strategies mainly; reducing the number of meals taken as well as relying on less preferred or less expensive foods. Overall, the coping strategy index was 32.9.

Recommendations

Low MNP Coverage (1.2%)

- Strengthen micro nutrient programme The County should procure and distribute MNPs (from the County allocation to Nutrition Department) to all the 7 sub counties.
- Initiate and strengthen MNP supplementation for children 6 - 23 months in Kilifi County and sensitize the community on MNPs and their importance.

Low Vitamin A Coverage (especially twice Supplementation at 47.4%)

- Formulate a strategy to reach the children 6 – 36 months
- Allocating resources for outreaches and the ECD strategy
- Enhance community/social mobilization & sensitization using, community strategy, outreach services as well as malezi bora

Low utilization of iron and folic acid by pregnant women

- Prepositioning, quantification and procurement of IFAs (combined)
- Encourage pregnant women to do 8 ANC visits
- Sensitize health workers on the new guidelines that advocate for the 8 ANC visits
- Sensitize the PHOs/ CHEWs & CHVs on importance of IFAs
- Sensitize the community on IFAs and ensure that all pregnant women regularly take the same
- Continued on job training on High Impact nutrition interventions to health workers

High Stunting rates (at 35.9% at the County level and 46.0% at stratum 1)

- Community sensitization using the community strategy

- Implement BFHI in Kilifi County Hospital, Malindi SC Hospital & Mariakani SC Hospital
  Conduct a training on Baby Friendly Community Initiative targeting; Ganze sub county and model health facilities (Mtwapa, Matsangoni, Rabai, Gotani)
- Training of health workers (especially Nutritionists) on MIYCN
- Finalization and dissemination of the Kilifi County Complementary Feeding Strategy
- Training the community on importance of food diversity
- Allocating resources for outreaches
- Enhance community/social mobilization

Sub optimal hygiene and sanitation practices

- Strengthen the integration of CLTS to Nutrition Interventions
- Incorporate the CLTS focal person into the County Nutrition Technical Forum

1.0. Introduction

1.1. Background

Kilifi County is located in the coastal region of Kenya. The County borders Kwale County to the south west, Taita Taveta to the west, Tana River County to the North, Mombasa County to the south and Indian Ocean to the East. Kilifi County occupies an area of approximately 12,609.7 km squared and a population of 1, 466, 856 people. The County is further subdivided in to 7 sub counties namely; Kilifi North, Kilifi South, Malindi, Rabai, Kaloleni, Magarini and Ganze sub counties and 4 livelihood zones as illustrated in figure 1 below. The livelihood zones include; marginal mixed farming, livestock/ranching, cash cropping/dairy farming and food cropping

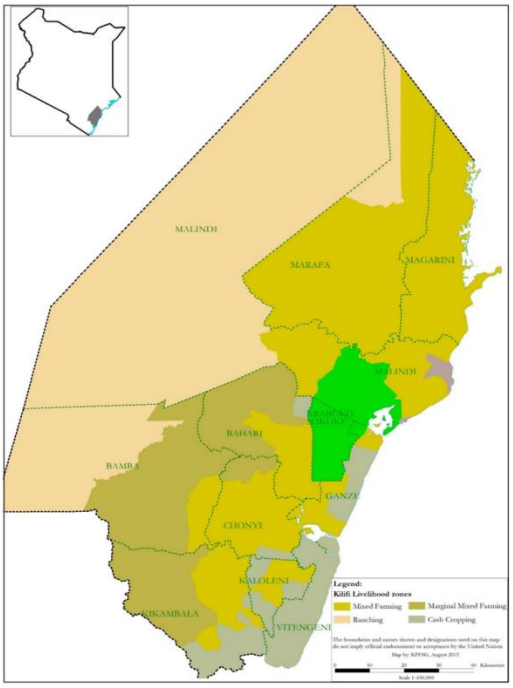


Figure 1: Kilifi County livelihood zones

Generally, Kilifi County receives rainfall range 300mm in the hinterland to 1300 mm in the coastal belt. The coastal belt receives an annual average annual rainfall of 900mm to 1,100 mm with marked decrease in intensity towards hinterlands. Areas with the highest rainfall include Mtwapa and to the north of coastal strip around the Arabuko Sokoke forest. Evaporation ranges from 1800mm around the coastal strip to 2200mm in the Nyika plateau in the interior. The highest evaporation rate is experienced during the months of January to March in all parts of the County.

The annual temperature ranges between 21˚C and 30˚C in coastal belt and between 30˚C and 34˚C in the hinterland.

Currently the overall situation is at alarm stage of drought cycle. The worst hit zone is the livestock and ranching livelihood zone which is at the emergency phase.

The marginal mixed farming livelihood zone is at alarm phase while the food crop farming and cash cropping/dairy farming zone are at alert phase of the drought cycle. The situation is deteriorating in all livelihood zones. Based on October NDMA early warning bulletin, all other indicators were below normal apart from utilization indicators i.e. MUAC and CSI indicating a worsening situation.

1.2. Survey Justification

The survey was meant to unveil the nutrition status of children aged 6 to 59 months as well as women of reproductive age. This was informed by the status of drought cycle which was in alarm and alert phase in some of the livelihood zones in the County. The situation was deteriorating in all livelihood zones based on NDMA's October drought early warning bulletin.

1.3. Survey Objectives

1.3.1. Main Objective

The main objective of the survey was to determine the prevalence of malnutrition among children aged 6 to 59 months and women of reproductive age (15 to 49 months old).

1.3.2. Specific Objectives

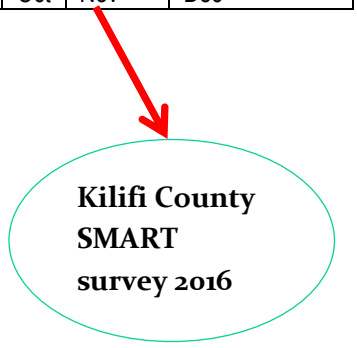
I. To assess the prevalence of malnutrition in children aged 6-59 months.
II. To determine the nutritional status of women of reproductive age (15-49 years) based on maternal mid upper arm circumference (MUAC).
III. To determine immunization coverage; measles (1st and 2nd dose), OPV1/3 and Vitamin A for children aged 6-59months.
IV. To determine deworming coverage for children aged 12 to 59 months.
V. To determine the prevalence of common illnesses (diarrhea, measles and ARI).
VI. To assess maternal and child health care practices.
VII. To assess water, sanitation and hygiene practices.
VIII. To assess the prevailing situation of household food security in the County.

1.4. Survey Timing

Kilifi County SMART survey was carried out in November 2016. During this period, the County is usually at the short rain period. At this season, the main activities are planting and weeding as shown in the table below

- Short rain Harvest - Short dry spell - Reduced milk yield - Increased household stock - Land preparation			- Planting/weeding - Long rains - High calving rate - Milk yields increases			- Long rain harvest - Long dry spell - Land preparation - Increased household food stocks - Kidding (Sep)			- Short rains - Planting/weeding		
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Source: NDMA Early warning bulletin



2.0. Methodology

2.1. Survey Design

The survey was cross sectional and descriptive by design. Standardized Monitoring and Assessment on Relief and Transition methodology was be adopted in the study. The study applied quantitative approach.

2.2. Sampling

2.2.1. Study Population

The study population included the entire population in Kilifi County. It is estimated that the County has 1,466, 856 people. All villages (clusters/sampling units) in the County which were accessible, secure or not deserted were included in the sampling frame.

2.2.2. Sample Size Calculation

Anthropometric Sample Size Calculation

Two stage sampling was used in the survey. The first stage involved random selection of clusters from the sampling frame based on probability proportion to population size (PPS). Emergency Nutrition Assessment (ENA) for Standardized Monitoring for Assessment for Relief and Transition (SMART) July 2015 was used in calculation of sample size. Table 3 below summarizes the sample size calculation based on ENA software.

Table 2: Sample size calculation using ENA software

Parameter of Anthropometry	Value	Rationale
Estimated GAM Prevalence	4.1%	Based on 2014, Kenya Demographic and Health survey
±Desired precision	2.5%	Since the situation is getting worse, the precision ought to be higher
Design Effect	1.8	To cater for differences in livelihood zones
Minimum No. of children Sampled	**474**	
Average household size	5.5	Based on County Integrated Development Plan 2013- 2017
% of children under five years	17.3%	Based on 1999 KNBS Household and Population Census estimates
% Non-response rate	3.0%	To cater for unforeseen non response
Minimum Number of Households sampled	**570**	

2.3 Sampling Methods

2.3.1. First Stage Sampling

This survey applied 2 stage stratified cluster sampling method. Due to differences in drought status in different livelihood zones, the County was stratified in 2 strata. Stratum 1 (most affected livelihood

zone) included, the livestock and ranching livelihood zone as well as the marginal mixed farming livelihood zone. Administratively, this stratum included 3 sub counties namely; Magarini, Ganze and Kaloleni sub counties. Stratum 2 (least affected livelihood zones) included the mixed farming and the cash cropping/dairy farming zone. Administratively stratum 2 included 4 sub counties namely; Kilifi North, Kilifi South, Malindi, and Rabai sub counties. To meet the minimum number of households, over sampling was done.

Based on logistical considerations, it was possible to administer 16 questionnaires per team per day. To obtain the number of clusters, the total number of households was divided by the number of households to be reached per team per day (16). This translated to a minimum of 36 clusters or 18 clusters per stratum. To achieve the minimum number of clusters required to make a decision based on SMART survey recommendations, each stratum was over sampled by 7 clusters to make them 25 clusters per stratum.

2.3.2. Second Stage Sampling

The second stage sampling involved selection of households using simple random sampling method. Led by a village guide, the survey teams developed a sampling frame in each of the village sampled during the 1st stage sampling in case such a list never existed. From the list the survey teams randomly selected 16 households where they administered household questionnaire (in all households) and anthropometric, morbidity and immunization questionnaire in household with children aged 6 to 59 months.

2.4. Data Collection

Data Collection was done for 7 days (7th to 13th November 2016) by 6 teams. Every team was composed of 4 members who included 1 team leader, 2 measurers and 1 community guide. The teams were trained for 4 days prior to field work. The teams were trained on, the survey objectives, methodology, malnutrition diagnosis, anthropometric measurements, sampling methods, data collection tools, ODK data collection process as well as interviewing skills. A role play was included in the training to give the teams practical skills on data collection. On the 3rd day standardization test was done. The purpose of standardization test was to test the team's accuracy and precision in taking anthropometric measurements. The data collection tool was pilot tested in a cluster not selected to be part of the survey. Additionally, during the piloting the enumerators were required to undertake the entire process of the survey which included household selection, taking anthropometric measurements and also filling of the data collection forms.

The overall coordinator of the survey was Kilifi County Nutrition Coordinator with 1 sub county coordinator supporting him on supervision of teams. Supporting partners program officers also supported in supervision as well as offering technical guidance. Each of the supervisors was attached to one team to ensure thorough supervision throughout the survey. The supervisor's main responsibilities were to ensure that the methodology was followed, measurements were taken appropriately and tackling any technical issue which came up during data collection. On daily basis plausibility checks were done and gaps noted were communicated to all the teams before going to the field every morning.

2.3. Data Collection Tools and Variables

For the data collection purpose, electronic questionnaire was used. Each questionnaire consisted of identification information, household information, demographic information, anthropometric information, morbidity, immunization, maternal, WASH and food security data. Household, demographic and food security information were collected in all the sampled households. The rest of the data was collected from only households with children aged 6 to 59 months.

2.4. Data Analysis

Anthropometric data processing was done using ENA software version 2015 (July). World Health Organization Growth Standards (WHO-GS) data cleaning and flagging procedures was used to identify outliers which would enable data cleaning as well as exclusion of discordant measurements from anthropometric analysis. The 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 and exported to SPSS for further analysis. All the other quantitative data were analyzed in Ms. Excel and the SPSS (Version 20) computer package.

2.5. Data Quality Control Measures

To ensure data collected was valid and reliable for decision making, a number of measures were put in place. They included;

- Thorough training was done in 4 days for all survey participants, the training dwelt on SMART methodology, survey objectives, interviewing techniques and data collection tools.
- Ensuring all anthropometric equipments were functional and standardized. On daily basis each team was required to calibrate the tools.
- During the training exercise, standardization test was done; in addition, piloting of tools was done to ensure all the information was collected with uniformity.
- Conducting a review of data collection tools during training and after the pilot test.
- All the survey teams were assigned a supervisor during data collection.
- The anthropometric data collected was entered daily on ENA software and plausibility check was run. Any issues noted were communicated to the teams before they proceeded to the field the following day.
- Teams were followed up by the supervisors to ensure all errors were rectified on time. More attention was given to the teams with notable weaknesses.
- Adequate logistical planning beforehand and ensuring the assigned households per clusters were be comfortably survey.

3.0. Results

3.1. General Characteristics of Study Population

This survey involved collection of information from 760 children aged 6 to 59 months in 800 households in Kilifi County. Figure 2 below shows the distribution of household sampled per sub County. in each stratum 400 households were sampled. All households sampled were surveyed translating to 100% response rate. The average household size recorded was 4.6 with stratum 1 recording 4.1 and stratum 2 recording a household size of 5.0. All members of the households (100%) that participated in the survey were residents. Overall, 88.7% of the children aged 3 to 18 years were enrolled in school. There was difference among the strata with stratum 1, 84.1% were enrolled in school compared to 92.8% in stratum 2. The main reasons for non-enrollment included; the family being poor to buy school items, schools being far from the households, parents/caregivers thought that the child was young to be in school as well as disability.

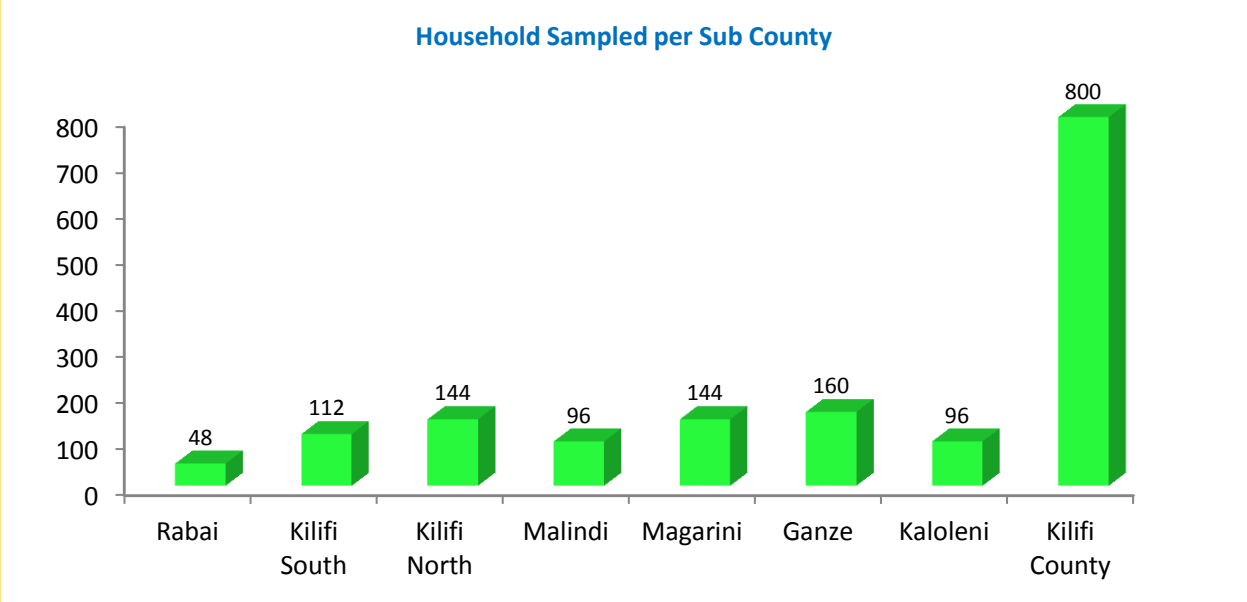


Figure 2: Household sampled per Sub county

The main occupation of household head at the County level were waged labor (33.7%), own farm labor (17.3%) and petty trading (13.4%). In stratum 1, the main occupation of household head were waged labor (30.9%), own farm labor (24.4%) and firewood/charcoal trading. In stratum 2, waged labor was the major main household head occupation (35.9%), followed by salaried/employed (17.3%) and petty trading (15.3%) as shown in table 3 below.

While 30.8% of households has no income source at the County level, 25.4% of the households had casual labor as their main source of income and 20.9% had petty trading as their source of income. The same trend was observed in stratum 1 where 34.3% had no income source and 27.1% and 22.7% had

petty trading and casual labor as their source of income respectively. In stratum 2, fewer households (27.2%) had no income source, 28.2% had casual labor as their main source of income and 14.9% were practicing petty trading as their main source of income as shown in table 4 below.

Table 3: Main occupation of household head

Occupation	County	Stratum 1		Stratum 2	
	%	No.	%	No.	%
Livestock herding	3.4	19	4.9%	8	2.0%
Own farm labor	17.3	94	24.4%	42	10.6%
Employed (Salaried)	12.8	32	8.3%	69	17.3%
Waged labor	33.7	119	30.9%	143	35.9%
Petty trading	13.4	44	11.4%	61	15.3%
Merchant/Trader	1.1	3	0.8%	6	1.5%
Firewood/Charcoal	8.4	50	13.0%	16	4.0%
Fishing	1.7	5	1.3%	8	2.0%
Others (Specific)	8.1	19	4.9%	45	11.3%

Table 4: Main source of income

Main Source of Income	County	Stratum 1		Stratum 2	
	%	No.	%	No.	%
No Income Source	30.8	133	34.3%	108	27.2%
Sale of Livestock	2.2	16	4.1%	1	0.3%
Sale of livestock products	1.0	5	1.3%	3	0.8%
Sale of crops	2.8	6	1.5%	16	4.0%
Petty trading e.g. Sale of firewood	20.9	105	27.1%	59	14.9%
Casual labor	25.4	88	22.7%	112	28.2%
Permanent jobs	7.8	22	5.7%	39	9.8%
Sale of personal assets	1.3	1	0.3%	9	2.3%
Remittances	1.1	2	0.5%	7	1.8%
Others	6.7	10	2.6%	43	10.8%

3.2. Distribution of Age and Sex (children under-fives)

A total of 758 children aged 6 to 59 months were sampled. These included 356 children in stratum 1 and 402 children from stratum 2. Overall, 385 boys and 373 girls participated in the survey. The boy: girl ratio was 1.0 (p= 0.663). Table 5 below is a summary of sex and age distribution of children who were assessed. The age ratio of children 6-29 years to 30-59 years was 0.91 (p=0.317) which was within the expected value. Figure 3 illustrates the age and sex distribution of the children

Table 5: Age and Sex ratio

AGE (mo)	Boys no.	%	Girls no.	%	Total no.	%	Ratio Boy:girl
6-17	96	56.1	75	43.9	171	22.6	1.3
18-29	93	48.7	98	51.3	191	25.2	0.9
30-41	82	48.5	87	51.5	169	22.3	0.9
42-53	78	47.0	88	53.0	166	21.9	0.9
54-59	36	59.0	25	41.0	61	8.0	1.4
Total	**385**	**50.8**	**373**	**49.2**	**758**	**100.0**	**1.0**

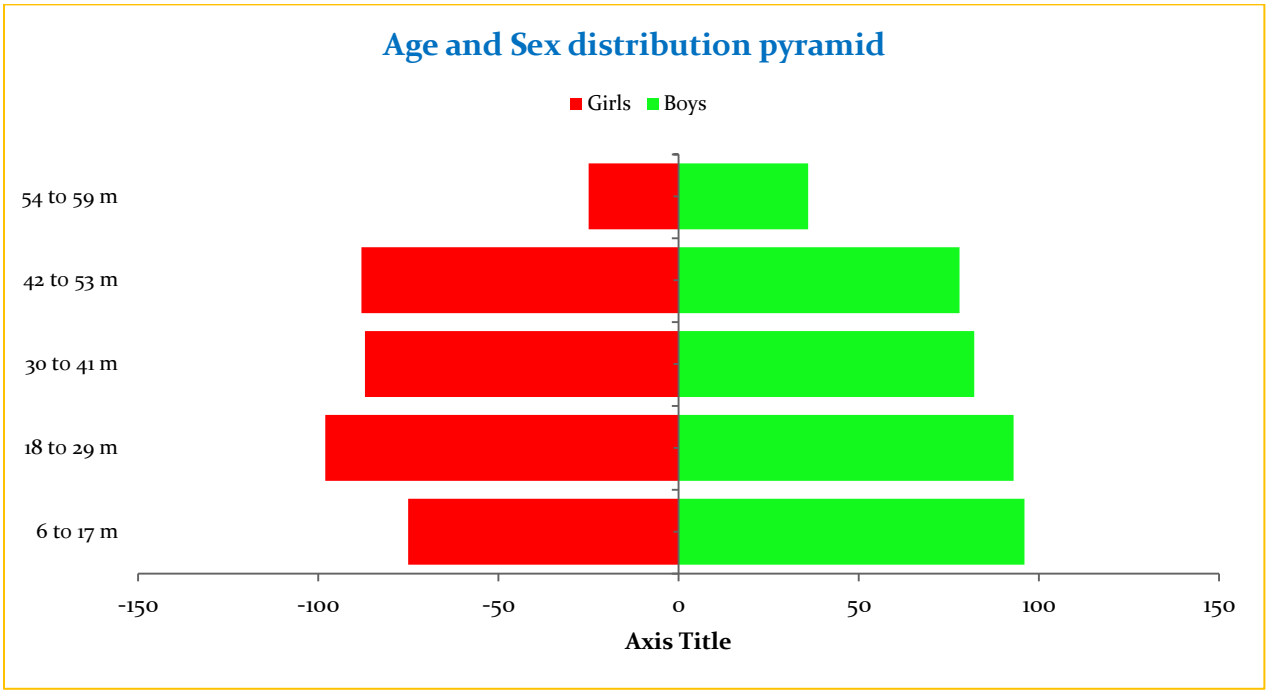


Figure 3: Age and sex distribution pyramid

3.3. Under-five Nutrition Status

Under five nutrition status was assessed using anthropometric indicators namely, Weight for Height and MUAC (wasting or acute malnutrition), Height for Age (stunting or chronic malnutrition) and weight for age (underweight). Analysis was based on 2006 WHO reference standards.

3.3.1. Prevalence of Acute malnutrition (Wasting)

According to UNICEF nutrition glossary (2012), malnutrition is defined a state in which the body does not have enough of the required nutrients (under nutrition) or has excess of the required nutrients (over nutrition). Acute malnutrition is defined as low weight for height in reference to a standard child of a given age based on WHO growth standards. This form of malnutrition reflects the current form of malnutrition. Acute malnutrition can further be categorized as severe acute malnutrition and moderate acute malnutrition. Severe acute malnutrition is defined as weight for height < -3 standard deviation in comparison to a reference child of the same age. It also includes those children with bilateral edema as

well as those with MUAC less than 11.5cm. Moderate Acute Malnutrition on the other hand is defined as weight for height >= -3 and <-2 standard deviation in comparison to a reference child of the same age and sex, but also include those children with MUAC < 12.5 cm and >= 11.5 cm. The Sum of all children with moderate and severe acute malnutrition is referred as global acute malnutrition (GAM).

Prevalence of Acute Malnutrition based on Weight for Height by sex

Analysis of acute malnutrition was based on 732 children aged 6 to 59 months (370 boys and 362 girls). There was an exclusion of 28 children who were flagged off as outliers. From the analysis Kilifi global acute malnutrition was **4.6% (3.3- 6.6, 95% C.I.).** The SAM rate in the County was 0.4% (0.1- 1.3, 95% C.I.). Among the strata, stratum 1 and 2 had almost the same number of children affected by acute malnutrition with stratum 1 having 4.7 %(2.7-8.2, 95% C.I.) and stratum 2 was 4.6 (2.9- 7.3, 95% C.I) while SAM was 0.3%(0.0- 2.3, 95% C.I.) and 0.5% (0.1- 3.9, 95% C.I.) for stratum 1 and 2 respectively. There was no significant difference between GAM prevalence between the 2 strata (p= 0.9522) as well as between boys and girls (p= 0.050). Table 6 below summarizes the GAM prevalence in Kilifi County.

Table 6: Prevalence of acute malnutrition based on Weight for Height Z- score (WHO 2006 Standards)

	GAM (95% C.I.)			SAM (95% C.I.)		
	All	Boys	Girls	All	Boys	Girls
Kilifi County	4.6% (3.3-6.6)	6.2% (4.2- 9.1)	3.0% (1.4- 4.6)	0.4% (0.1-1.3)	0.5% (0.1- 2.2)	0.3% (0.0- 2.2)
Stratum 1	4.7% (2.7- 8.2)	6.8% (4.0- 11.3)	2.4% (0.5- 11.2)	0.3% (0.0- 2.3)	0.6% (0.1- 4.3)	0.0% (0.0-0.0)
Stratum 2	4.60% (2.9-7.3)	5.7% (3.0-10.5)	3.5% (1.5- 7.9)	0.5% (0.1-2.1)	0.5% (0.1-3.9)	0.5% (0.1- 3.7)

The prevalence of acute malnutrition by edema is 0.0%

Figure 4 below is a graphical representation of distribution of weight for height of children surveyed in relation to the WHO standard curve (reference children). The curve slightly shifts to the left with a mean of -0.27(SD ±1.04) an indication of slight under nutrition in comparison to reference children.

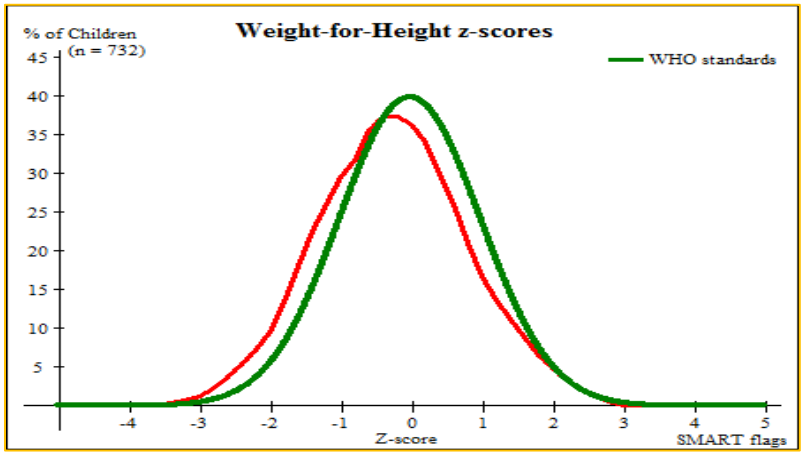


Figure 4: Graphical Representation of WFH for children assessed compared to reference children

Analysis of acute malnutrition by age

Further analysis was done on prevalence of acute malnutrition based on sex and age as indicated in table 8 below. From the analysis, there was no major difference among children aged 6 to 29 compared to the older children (aged 30 to 59 m).

Table 7: Prevalence of acute malnutrition by age based on WFH Z- score 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	164	0	0.0	7	4.3	157	95.7	0	0.0
18-29	184	1	0.5	7	3.8	176	95.7	0	0.0
30-41	166	1	0.6	6	3.6	159	95.8	0	0.0
42-53	160	1	0.6	6	3.8	153	95.6	0	0.0
54-59	58	0	0.0	5	8.6	53	91.4	0	0.0
Total	**732**	**3**	**0.4**	**31**	**4.2**	**698**	**95.4**	**0**	**0.0**

Analysis of Acute Malnutrition based on presence of edema

Presence of bilateral edema is a sign of severe acute malnutrition. Analysis was therefore done based on this indicator. As shown in table 9 below, no edema case was recorded among the children surveyed.

Table 8: Prevalence of acute malnutrition based on presence of edema

	<-3 z-score	>=-3 z-score
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 14 (1.8 %)	Not severely malnourished No. 743 (98.2 %)

Prevalence of Acute Malnutrition based on MUAC

Malnutrition can also be diagnosed using MUAC. MUAC is a good indicator of muscle mass and can be used as a proxy of wasting (United Nation System Standing Committee on Nutrition). It is also a very good predictor of the risk of death. Very low MUAC (< 11.5 cm for children 6 to 59 months), is considered a high mortality risk and is a criteria for admission of outpatient therapeutic or in patient therapeutic program (when accompanied with complications) for treatment of severe acute malnutrition. A MUAC reading of 11.5 cm to <12.5 cm is considered as moderate malnutrition. Analysis of the nutrition status for children aged 6 to 59 months based on MUAC and or presence of oedema resulted to GAM of **2.8% (1.5- 4.9, 95% C.I.)** and SAM of **0.8% (0.3- 2.4, 95% C.I.)** as indicated in table 9 below. Based on MUAC, stratum 1 was more affected with a GAM of **4.5% (2.3- 8.7, 95% C.I.)** and SAM of **1.4% (0.4- 5.1, 95% C.I).** There was a statistical significant difference between stratum 1 and 2 (p= 0.0427). Table 9 below summarized the prevalence of acute malnutrition by MUAC.

Table 9: Prevalence of acute malnutrition based on MUAC

	GAM (95% C.I)			SAM (95% C.I)		
	All	Boys	Girls	All	Boys	Girls
Kilifi County	2.8 % (1.5 - 4.9)	2.1 % (0.9 - 4.6)	3.5 % (1.9 - 6.4)	0.8 % (0.3 - 2.4)	0.5 % (0.1 - 3.7)	1.1 % (0.4 - 2.8)
Stratum 1	4.5 % (2.3 - 8.7)	3.8 % (1.6 - 8.8)	5.2 % (2.4 - 11.0)	1.4 % (0.4 - 5.1)	1.1 % (0.1 - 7.8)	1.7 % (0.6 - 5.3)
Stratum 2	1.2 % (0.5 - 3.3)	0.5 % (0.1 - 3.9)	2.0 % (0.6 - 6.0)	0.2 % (0.0 - 2.0)	0.0 % (0.0 - 0.0)	0.5 % (0.1 - 3.9)

Prevalence of Underweight based on WFA

Underweight is defined as low weight for age relative to National Centre for Health and Statistics or World Health Organization reference median. In this survey, the later was used. Children with weight for age less than -2 SD in relation to a reference child are classified as underweight while those with less than -3 SD are classified as severe underweight. Underweight is a composite form of under nutrition and has elements of both acute under nutrition (wasting) as well as chronic under nutrition (stunting). As indicated in table 11 below, the prevalence of underweight among children aged 6 to 59 months in Kilifi County was **18.2% (15.0 – 21.9, 95% C.I.)** while those who were severely underweight was **4.2% (2.8-6.2, 95% C.I.)**. Stratum 1 was more affected by underweight with a prevalence of 22.8% (17.4-29.3, 95% C.I) and severe underweight of 4.2% (2.8- 6.2, 95% C.I) compared to stratum 2 which had an underweight of 14.0% (11.1%- 17.5% C.I) and severe underweight of 2.8% (1.5- 5.2, 95% C.I). As shown in table 10 below, more boys than girls were underweight.

Table 10: Prevalence of underweight based on WFA Z- score

	Underweight (95% C.I)			Severe underweight (95% C.I)		
	All	Boys	Girls	All	Boys	Girls
Kilifi County	18.2 % (15.0 - 21.9)	22.8 % (18.0 - 28.4)	13.4 % (10.2 - 17.5)	4.2 % (2.8 - 6.2)	5.6 % (3.2 - 9.4)	2.7 % (1.4 - 5.3)
Stratum 1	22.8 % (17.4 - 29.3)	29.9 % (22.3 - 38.8)	15.4 % (9.9 - 23.1)	5.5 % (3.1 - 9.5)	7.3 % (3.4 - 15.0)	3.6 % (1.5 - 8.2)
Stratum 2	14.0 % (11.1 - 17.5)	16.5 % (12.0 - 22.2)	11.3 % (7.8 - 16.2)	2.8 % (1.5 - 5.2)	4.0 % (1.9 - 8.2)	1.5 % (0.4 - 6.4)

Prevalence of Chronic malnutrition (Stunting) based on Height for Age (HFA)

WHO define stunting as height for age less than – 2 SD from median height for age of reference population. Childhood stunting is an outcome of maternal undernutrition as well as inadequate infant and young child feeding. It is associated with impaired neurocognitive development, a risk maker of non-communicable diseases and reduced productivity later in life (WHO 2013). Analysis of stunting prevalence based on height for age revealed an overall stunting rate of **35.9 %(31.2- 40.9, 95% C.I.)** and a severe stunting (HFA< -3 in reference to standard population) rate of **12.7% (9.6- 16.7, 95%**

C.I.) as shown in table 11 below. Boys were more stunted than girls. Table 13 illustrates stunting by age. Children in stratum 1 were more stunted compared to those in stratum 2. There was a significant difference in stunting prevalence between the two strata (p= 0.0001). Though boys were more stunted than girls there was no significant statistical difference between sexes (boys and girls) (p= 0.053).

Table 11: Prevalence of stunting based on HFA Z-score

	Stunting (95% C.I)			Severe Stunting (95% C.I)		
	All	Boys	Girls	All	Boys	Girls
Kilifi County	35.9 % (31.2 - 40.9)	39.9 % (33.4 - 46.8)	31.7 % (26.7 - 37.2)	12.7 % (9.6 - 16.7)	15.7 % (11.3 - 21.4)	9.6 % (7.0 - 13.2)
Stratum 1	46.0 % (38.8 - 53.3)	54.3 % (44.4 - 63.9)	37.0 % (29.6 - 45.2)	19.7 % (14.3 - 26.5)	26.6 % (19.1 - 35.8)	12.3 % (8.1 - 18.3)
Stratum 2	27.2 % (22.3 - 32.6)	28.0 % (22.2 - 34.5)	26.3 % (19.5 - 34.5)	6.8 % (4.2 - 10.8)	7.3 % (4.2 - 12.4)	6.3 % (3.4 - 11.3)

Figure 5 below shows the graphical representation of distribution of HFA of surveyed children in relation to reference children (based on WHO standards). There is a slight drift to the left implying that the surveyed children were stunted in comparison to WHO standard curve with a mean± sd of –1.25±1.20.

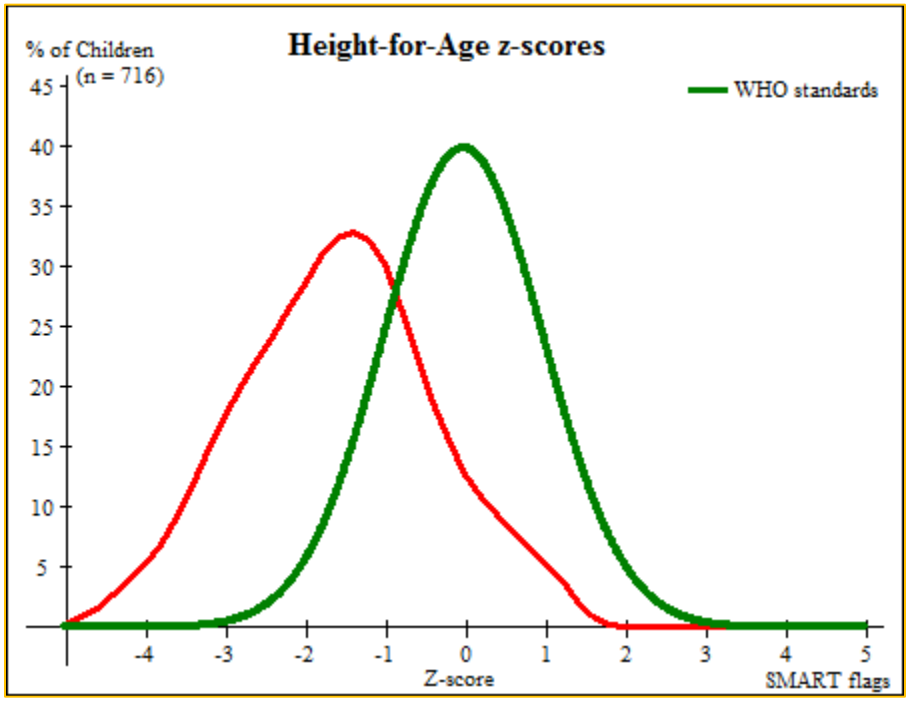


Figure 5: Graphical presentation of HFA distribution in comparison with WHO standard

3.4. Child Morbidity and Health Seeking

Based on the UNICEF conceptual framework of the causes of malnutrition, disease is categorized as one immediate cause alongside inadequate diet. There is a relationship between the two whereby disease may alter food intake while inadequate intake of some key nutrients may lead to infection. Ultimately they all lead to one outcome; malnutrition.

Assessment was done on the diseases that affected children 6 to 59 months in the past 2 weeks. Caregivers were asked whether their children had been ill in the past 2 weeks prior to the survey date. Those who gave an affirmative answer to this question were further probed on what illness affected their children and whether and where they sought any assistance when their child/children were ill. Those who indicated that their child/children suffered from watery diarrhea were probed on the kind of treatment that was given to them.

Among the children assessed, 40.7% of them were sick in the past 2 weeks prior to the survey. Stratum 1 was most affected at 48.7% compared to stratum 2 where only 33.5% who were sick. Most children who were sick (49.2%) suffered from ARI at the County level. The same was replicated at the strata level where 50.6% and 42.2% of the children suffered from ARI in stratum 1 and 2 respectively. Table 12 below is a summary of morbidity in Kilifi County.

Table 12: Children morbidity

Illness	n(County)	% County	Stratum 1 (%)	Stratum 2 (%)
Total Illness	309	40.7%	48.7%	33.5%
Fever with Chills	107	34.6%	36.2%	32.6%
ARI	152	49.2%	50.6%	42.2%
Watery diarrhea	38	12.3%	9.8%	15.6%
Bloody diarrhea	2	0.6%	0.6%	0.7%
Others	42	13.6%	8.6%	25.2%

3.4.1. Therapeutic Zinc Supplementation during diarrhea episodes

Based on compelling evidence from efficacy studies that zinc supplementation reduces the duration and severity of diarrhea, in 2004 WHO and UNICEF recommended incorporating zinc supplementation (20 mg/day for 10-14 days for children 6 months and older, 10 mg/day for children under 6 months of age) as an adjunct treatment to low osmolality oral rehydration salts (ORS), and continuing child feeding for managing acute diarrhea. Kenya has adopted these recommendations (Innocent report 2009). According to Kenyan policy guideline on control and management of diarrheal diseases in children below five years in Kenya, all under-fives with diarrhea should be given zinc supplements as soon as possible. The recommended supplementation dosage is 20 milligrams per day for children older than 6 months or 10 mg per day in those below the age six months, for 10–14 days during episodes of diarrhea. This survey sought to establish the number of children who suffered from watery diarrhea and supplemented with zinc. Almost two thirds **(65.8%)** of those children who suffered from watery diarrhea were supplemented with zinc.

3.4.2. Health Seeking

At the County level, majority of caregivers (88.2%) whose children were sick in the past 2 weeks sought assistance from a number of sources. Among those who sought assistance, 68.5% did that from public clinic. There was disparity among those who sought assistance in favor of stratum 1 where 78.5% sought

assistance from public clinic compared to stratum 2 where only 58.1% sought assistance from that source. Quite a number (18.9%) of caregivers sought assistance from private clinic or pharmacy. Stratum 2 recorded a higher proportion of caregivers who sought assistance from private clinic or pharmacy at 29.0% compared to stratum 1 (9.2%) as shown in figure 6 below

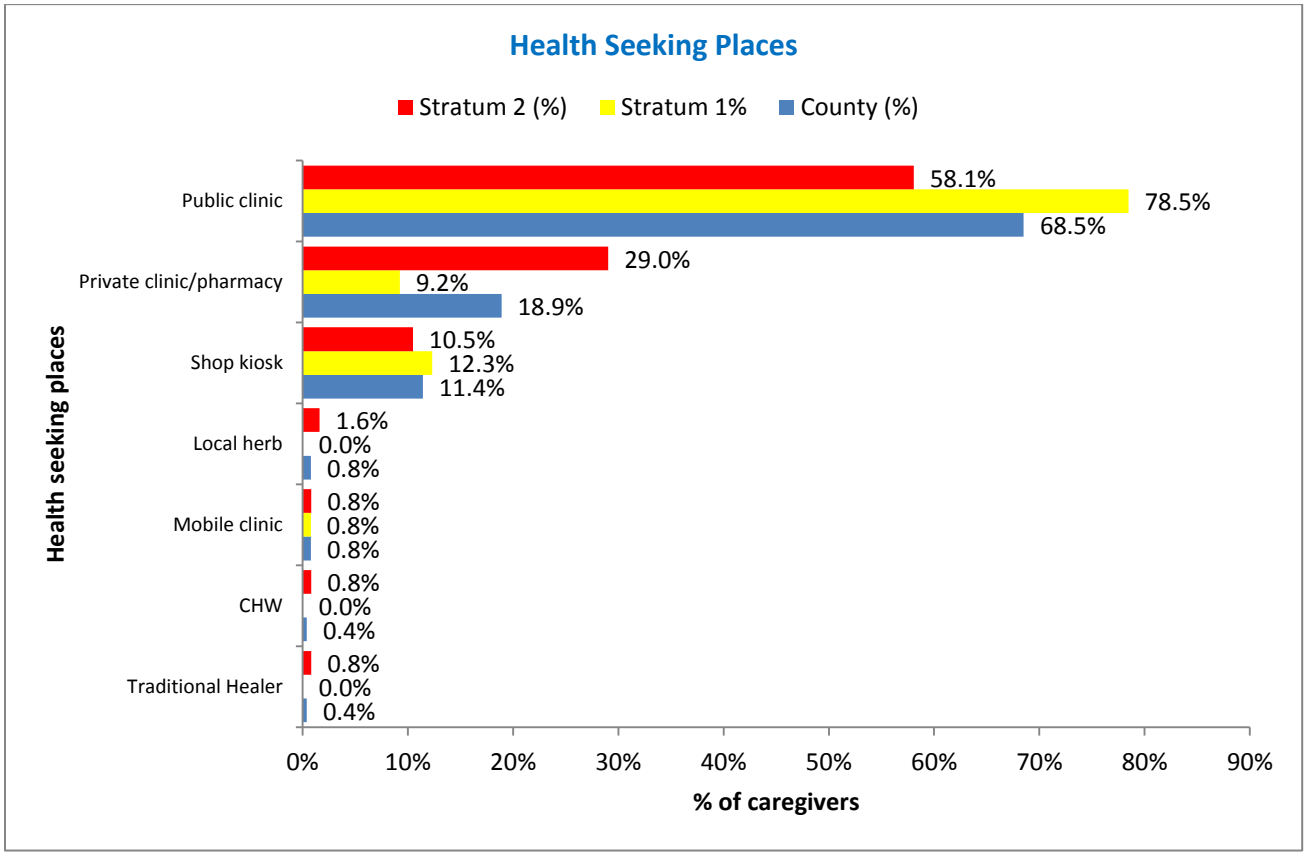


Figure 6: Health seeking places

3.5. Child Immunization, Vitamin A and Deworming

3.5.1. Immunization

Kenya aims to achieve 90% under one immunization coverage by the end of second medium term plan (2013- 2017). The Kenya guideline on immunization defines a fully immunized child as one who has received all the prescribed antigens ***and at least one Vitamin A dose*** under the national immunization schedule before the first birthday.

This survey assessed the coverage of 4 vaccines namely, BCG, OPV1, OPV3, and measles at 9 and 18 months. From this assessment, 97% of children were confirmed to have been immunized by BCG based on the presence of a scar. Those who were immunized by OPV1 and OPV3 were 97.0% and 95.9% respectively while 94.0 % had been immunized for measles. Among the strata, stratum 1 recorded, 97.8%, 97.1% and 95.9% of the children assessed were immunized with OPV1, OPV3 and measles in stratum 2 compared to 93.9%, 92.1% and 90.0% in stratum 1 for the same antigens respectively. Only 60.5% were immunized with second measles antigen at 18 months. Approximately 50.2% of children

aged 18 to 59 months were immunized with the second dose of antigen in stratum 1 while 68.3% of the children in the same age category received the same dose in stratum 2 as shown in figure 7 and 8 below.

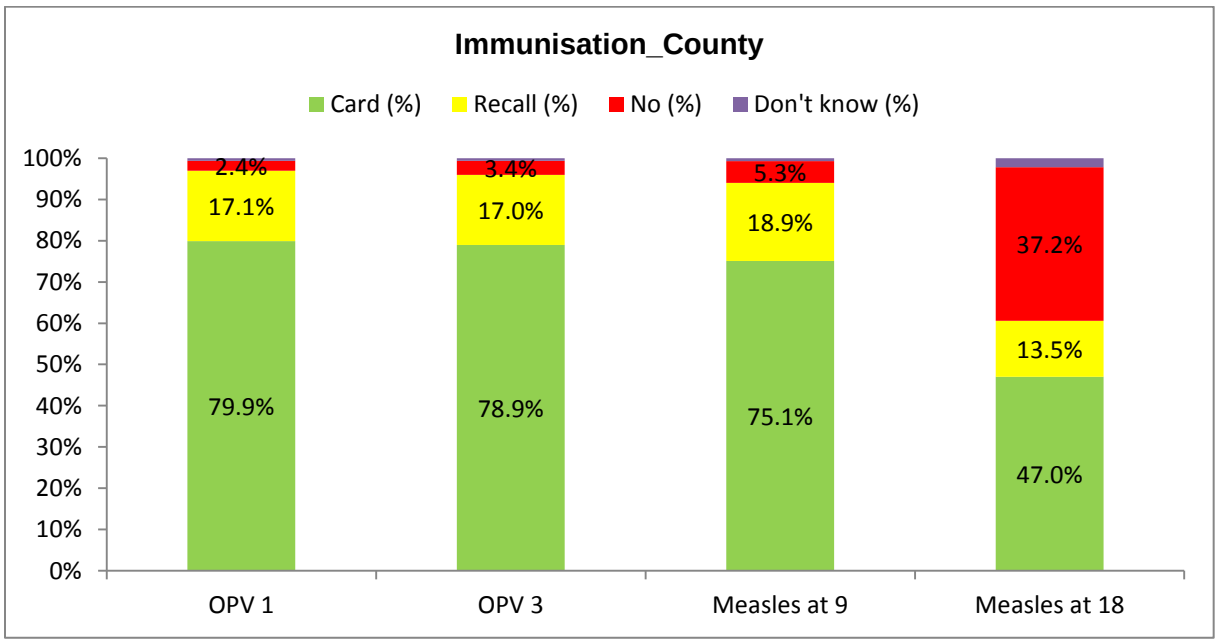
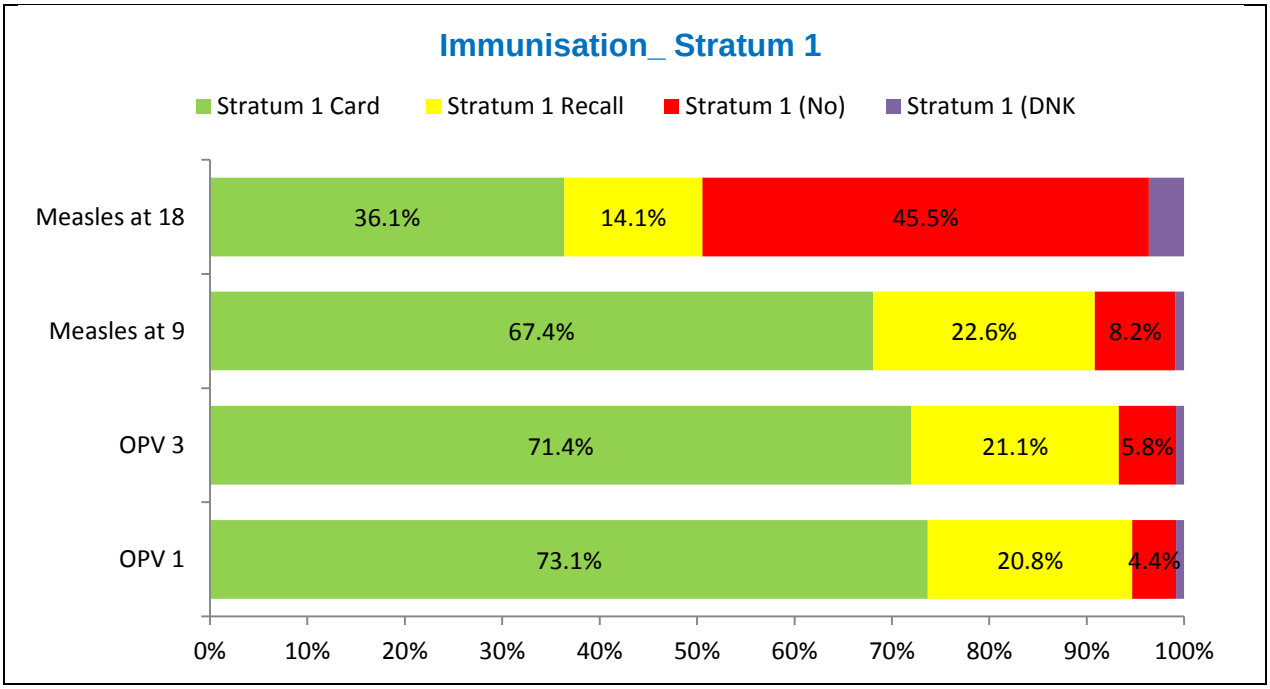


Figure 7: Child immunization_ Kilifi County



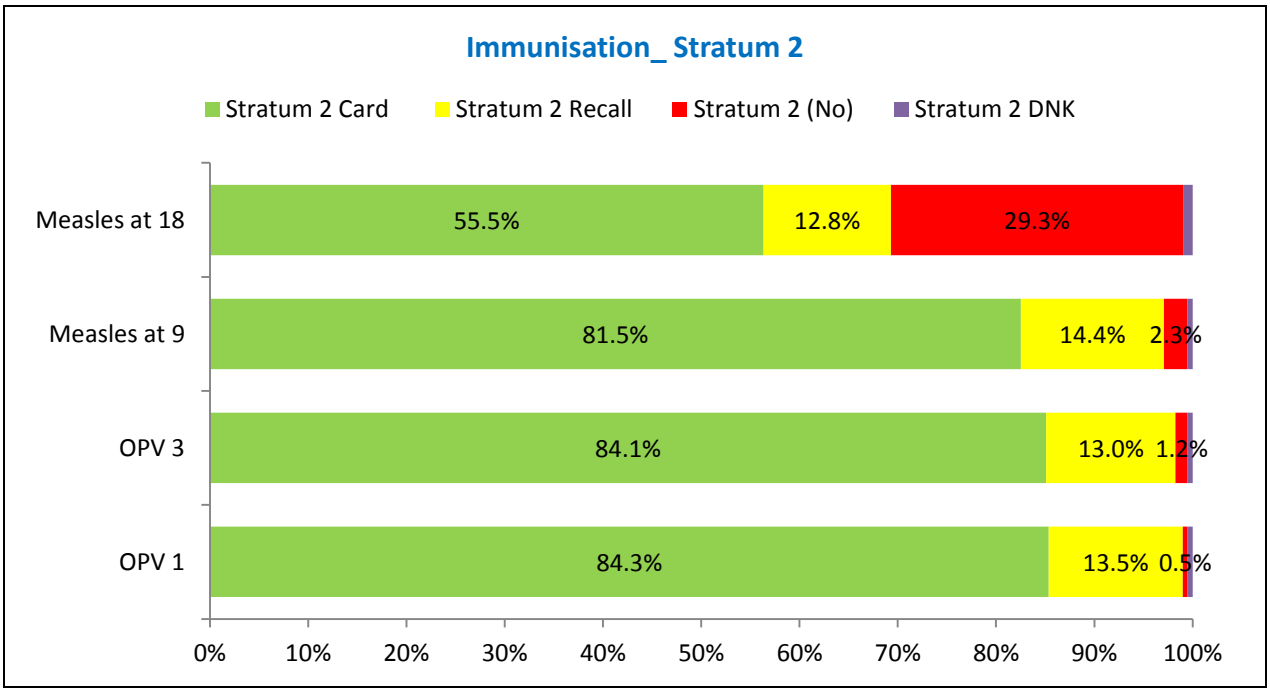


Figure 8: Comparison of Immunization for stratum 1 and 2

3.5.2. Vitamin A supplementation and Deworming

Evidence shows that, giving vitamin A supplements to children reduces the rate of mortality and morbidity. Vitamin A reduces mortality risk by 24% (WHO 2011). Guaranteeing high supplementation coverage is critical, not only to eliminating vitamin A deficiency as a public-health problem, but also as a central element of the child survival agenda. Delivery of high-dose supplements remains the principal strategy for controlling vitamin A deficiency. Food-based approaches, such as food fortification and consumption of foods rich in vitamin A, are becoming increasingly feasible but have not yet ensured coverage levels similar to supplementation in most affected areas (UNICEF 2007).

Poor data management on vitamin A logistics, inadequate social mobilization to improve vitamin uptake and placement of vitamin A at lower level of priority among other interventions has been cited as major challenges in achieving the supplementation targets (MOH Vitamin A supplementation Operational Guidelines for Health Workers 2012).

To assess vitamin A supplementation, parents and caregivers were probed on the number of times the child had received vitamin A in the past one year. Reference was made to the child health card and in case the card was not available recall method was applied. Among those who were supplemented, 74.2% was confirmed by the use of health cards with 21.6% who were confirmed by recall. Analysis of vitamin A supplementation for children aged 6months to 1 year indicates that 82.9% of this age group had been supplemented with vitamin A. Among those aged 12 to 59 months, 47.4% had been supplemented with vitamin A for 2 times in the past one year. Table 15 below summarizes vitamin A supplementation in Kilifi County. Figure 8 illustrates the comparison of vitamin A supplementation between stratum 1 and 2.

Assessment on deworming for children aged 12 to 59 months indicates a small uptake of deworming drugs; only 21.9% had taken de-wormers twice in the past one year. Low Vitamin A supplementation and deworming was attributed to lack of proper integration of vitamin A and deworming as well as lack of some of tools such as vitamin A monitor charts.

Table 13: Vitamin A and Deworming

Vitamin A supplementation and de worming	Number of Times	County (n)	County (%)	Stratum 1 (%)	Stratum 2 (%)
Children 6 to 11 m supplemented with Vitamin A (N= 82)	Once	68	82.9	75	92.1
Children 12 to 59 months supplemented with Vitamin A (N= 686)	Once	481	70.1	55.4	88.4
	Twice	325	47.4	31.3	61.1
Children aged 12 to 59 months dewormed	Once	414	60.3	47.5	71.4
	Twice	150	21.9	11.4	30.8

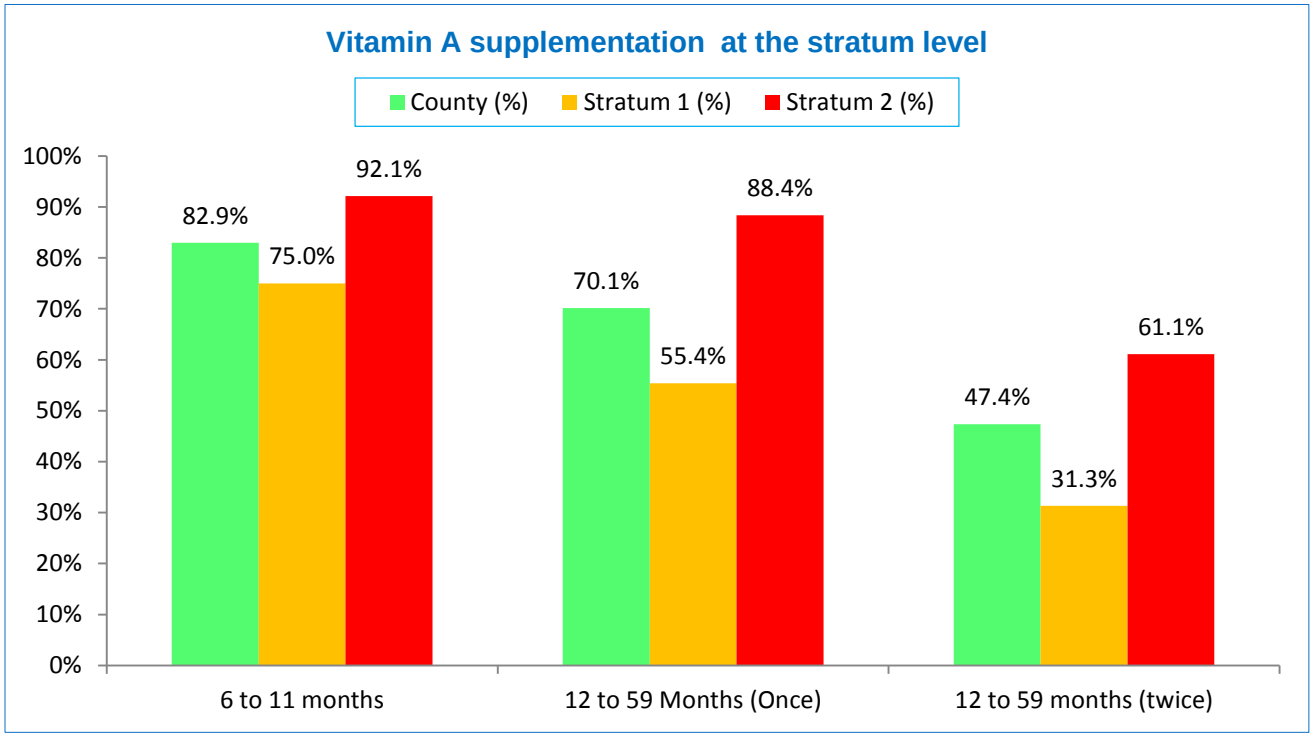


Figure 9: Vitamin A supplementation and deworming

3.5.2. Micro nutrient supplementation (Home Fortification using MNPs)

Micronutrient powders (MNPs), also known as Sprinkles contain a mix of micronutrients in powder form that are packaged in single-dose sachets and can be added directly to any semi-solid complementary foods prepared in the household without substantially affecting taste or color of the food. Iron and other essential MNs such as zinc, iodine, B vitamins, and vitamins A, C, and D may be added to the MNP sachets (micronutrients forum 2009). The Kenya National Guidelines on home fortification with MNPs for children aged 6 to 23 months recommend that each child to receive 10 sachets of MNPs per month. The MNPs should be consumed every third day and no more than 1 sachet per day. MNPs should be given for 6 months. The recommended delivery points are the health facilities.

Analysis of micronutrients supplementation was done with reference to the past 6 months period before the survey. Almost all children (98.8%) aged 6 to 23 months had not been enrolled in an MNP program. The major reason for non-enrollment was lack of awareness of existence of any MNP program (79.8%). Figure 10 below illustrates other reasons for non-enrollment in an MNP program.

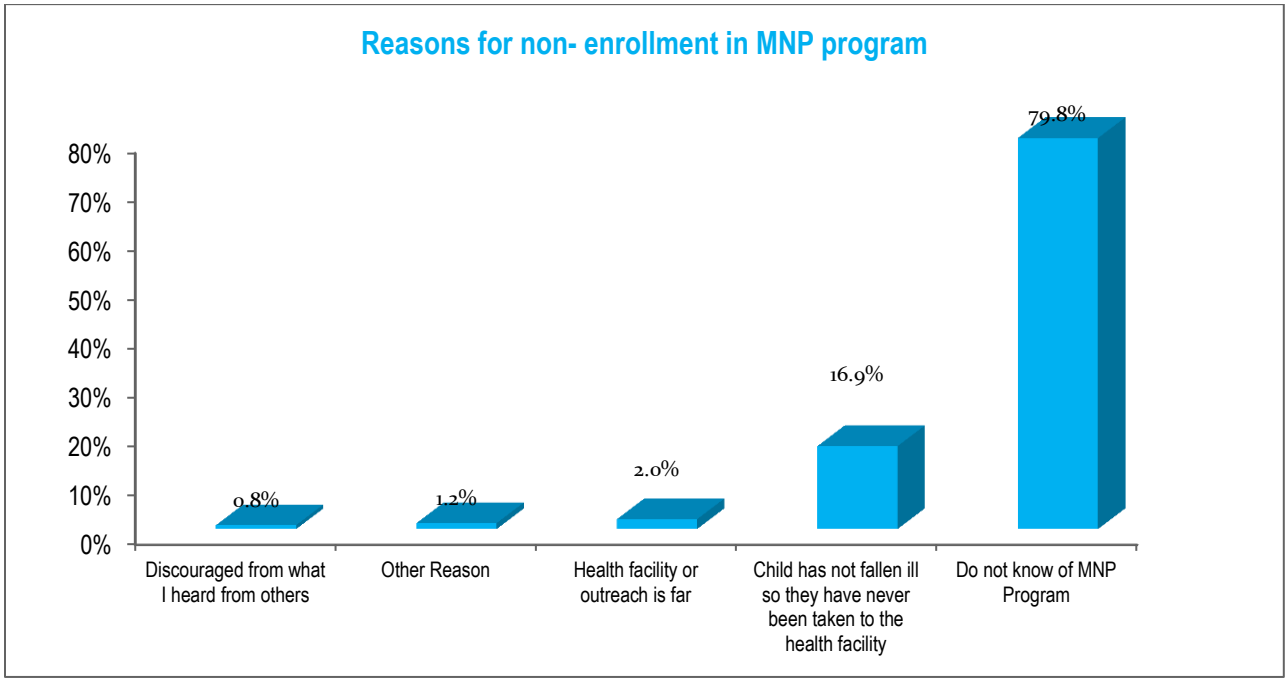


Figure 10: Reasons for non-enrollment in MNP program

3.6. Maternal Nutrition

Maternal nutrition has a direct impact on child survival. Pre- pregnancy nutrition influences the ability of a woman to conceive, determines the fetal growth and development and the size of the fetus and its overall health and that of the mother. Maternal nutrition was assessed using maternal MUAC for all women of reproductive age and iron and folic acid supplementation for women with children under two years of age.

WHO recommends daily consumption of 60mg elemental iron as well as 0.4mg folic acid throughout the pregnancy (WHO 2012). These recommendations have since been adopted by Kenya government in its 2013 policy guidelines on supplementation of FEFO during pregnancy.

Overall 660 women of reproductive age participated in the survey. A large proportion (63.0%) of the surveyed women of reproductive age was neither pregnant nor lactating. As shown in figure 12 below, 31.2% of the women interviewed were lactating with only 5.8% who were pregnant.

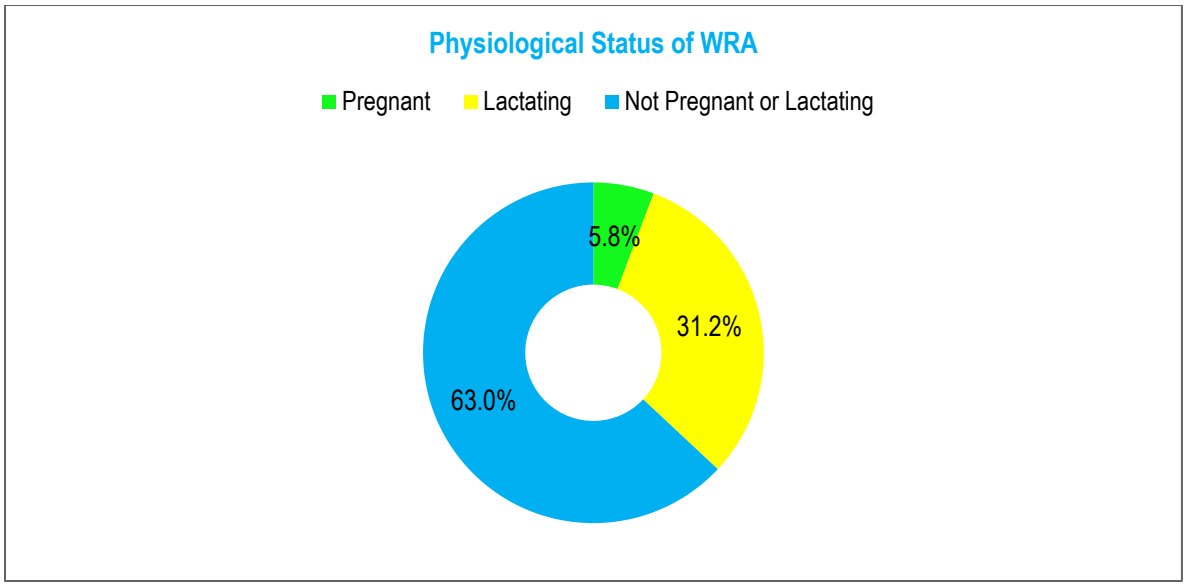


Figure 11: Physiological Status of WRA

The nutrition status of women was determined using MUAC. Women with MUAC less than 21 cm were classified as malnourished while those MUAC ranged from 21cm to 22.9cm were classified as under risk.

Overall, 1.8% of women of reproductive age assessed had MUAC less than 21cm thus classified as malnourished. Stratum 1 was more affected where 2.4% malnourished were compared to 1.0% in stratum 1. For pregnant and lactating women, 2.1% were malnourished with more burden being in stratum 1 at 4.2% compared to 0.7% in stratum 2 as shown in table 14 below.

Table 14: Maternal Nutrition Status

Indicator	n (County)	% County	Stratum 1(%)	Stratum 2 (%)
MUAC<21 cm All Women	12	1.8	2.4	1.0
MUAC< 21cm (PLW	5	2.1	4.2	0.7

Among women with children below 2 years of age, 87.3% had been supplemented with iron and folic acid during their immediate pregnancy. A large proportion of women from stratum 2 compared to stratum 1 were supplemented at 89.6% and 83.3% respectively. The mean iron and folic acid consumption was 80.3 days for the County, with stratum 2 recording 82.4 days while stratum 1 recorded 76.2 days. None of the surveyed women had consumed iron and folic acid in the recommended 270 days. Table 15 below is a summary of iron and folic acid consumption in days.

Table 15: IFA Consumption in days

IFAS consumption in days	No of Women (County)	County (%)	Stratum 1 (%)	Stratum 2 (%)
Less than 90 days	122	53.7	61.0	50%
90 to 180 days	100	44.1	33.8	49.3%
Above 180 days	5	2.2	5.2	0.7%

3.7. Water Sanitation and Hygiene Practices

3.7.1. Main Water Sources, Distance and Time to Water Sources

Everyone has the right to water. This right is recognized in international legal instruments and provides for sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic uses. An adequate amount of safe water is necessary to prevent deaths due to dehydration, to reduce the risk of water-related disease and to provide for consumption, cooking, and personal and domestic hygienic requirements. According to SPHERE handbook for minimum standards for WASH, the average water use for drinking, cooking and personal hygiene in any household should be at least 15 liters per person per day. The maximum distance from any household to the nearest water point should be 500 meters. It also gives the maximum queuing time at a water source which should be no more than 15 minutes and it should not take more than three minutes to fill a 20-litre container. Water sources and systems should be maintained such that appropriate quantities of water are available consistently or on a regular basis.

Majority of the household surveyed (82.6%) obtained their water from protected sources such as piped water, protected boreholes, protected spring and shallow well. There was a considerable difference among the strata in favor of stratum 2 where 94.2% obtained their drinking water from protected sources compared to 70.6% as shown in figure 12 below. The rest of the households obtained their drinking water from unprotected sources such as unprotected shallow well (4.7%), river or spring (4.2%) as well as earth pan (8.5%)

Analysis of distance to the water sources indicated that approximately two thirds of the household surveyed obtained their water from sources less than 500 m (less than 15 minutes walking distance) from their homes. In stratum one, only 50% of the households obtained their water from sources less than 500m compared to stratum 2 where 84.9% obtained their water from such distances. At the County level, 19.6% obtained their water from sources which were between 500m to 2 km, while 12.3% obtained their drinking water from sources which were more than 2 km as illustrated in table 16 below.

Table 16: Distance to water sources

Distance to water sources	County (n)	County (%)	Stratum 1 (%)	Stratum 2 (%)
Less than 500 m (less than 15min	532	67.7	50.0	84.9
500m to 2 km (15 min to 1hr)	154	19.6	30.4	9.0
More than 2 km (1 to 2hrs	97	12.3	18.8	6.0

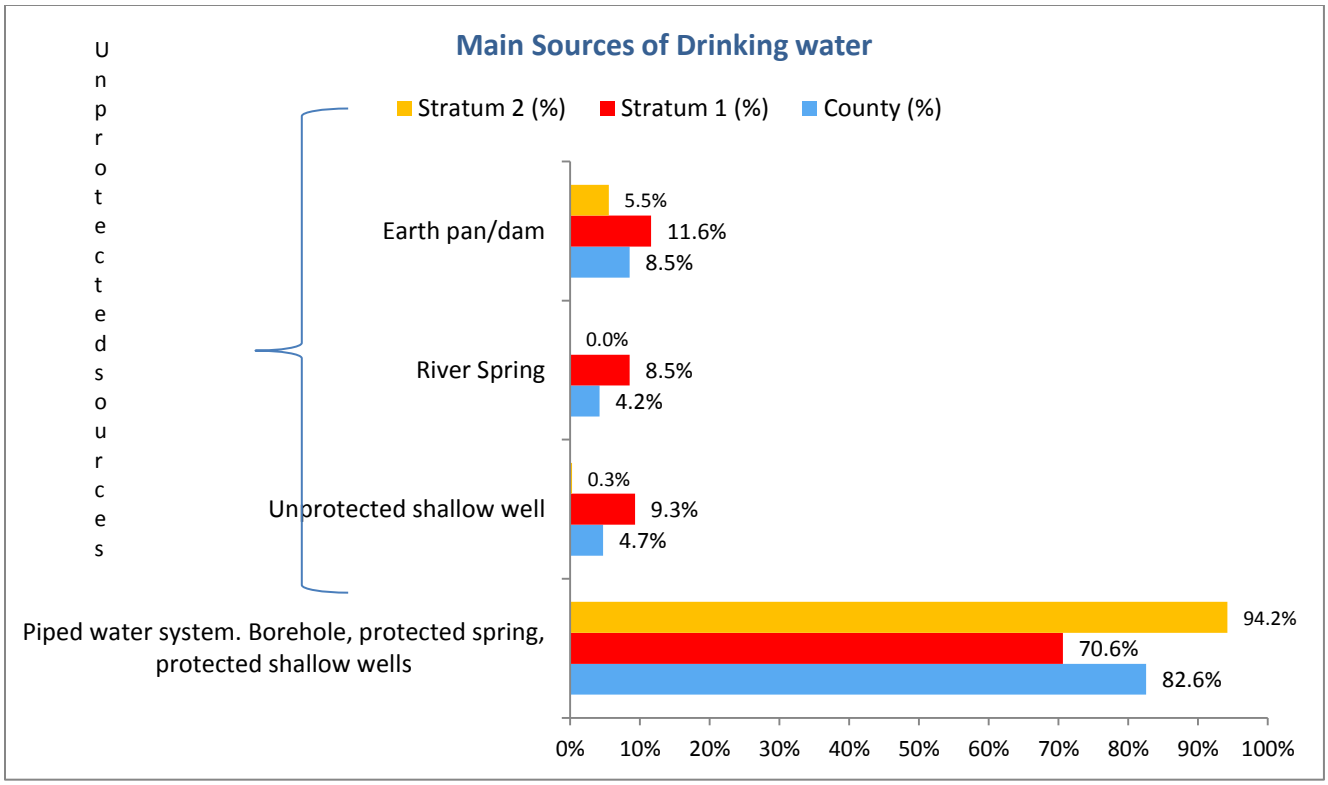


Figure 12: Main sources of drinking water

In regard to queuing for water, 43.9% of household reported to queue for water. Among those who queue for water, 44.9% queue for less than 30 minutes, 28.4% between 30 and 60 minutes while 26.7% queued for more than 1 hour. More households in stratum 1 (53.0%) queued for water compared to stratum 2 (34.5%)

3.7.2. Water Treatment

Only 9.3% of the households surveyed treated their drinking water at the County level with more households in stratum 2 (11.8%) treating their drinking water in comparison to stratum 2 where only 6.7% treated their drinking water. Table 17 below illustrates the methods used to treat drinking water.

Table 17 : Water treatment methods

Water treatment Method	County (%)	Stratum 1 (%)	Stratum 2 (%)
Boiling	26.0%	31%	23.4%
Use of chemicals	76.7%	65%	83.0%
Traditional herbs	2.7%	4%	2.1%
Pot filters	1.4%	0%	2.1%

3.7.3. Water Storage and Payment

Despite the fact that majority of household do not treat their drinking water, they also stored their water in open containers (76.2%) as opposed to closed container (only 23.8%) where they are less likely to have physical contamination.

Among the household surveyed, 78.2% purchased their water. Among those who purchased their water, 89.1% did it in terms of Jerri cans while the rest (11.9%) did it on monthly basis.

3.7.4. Handwashing

The importance of hand washing after defecation and before eating and preparing food, to prevent the spread of disease, cannot be over-estimated. Users should have the means to wash their hands after defecation with soap or an alternative (such as ash), and should be encouraged to do so. There should be a constant source of water near the toilet for this purpose. (SPHERE Handbook 2004).

Almost all the caregivers surveyed (96.7%) were aware of handwashing practices. In term of practice and based on 24 hour recall, majority of the respondents (94.1%) washed their hands before eating, while 61.8 % did it after visiting the toilet. Among the caregivers, 10.2% washed their hands after taking a child to toilet. Table 18 below is a summary of handwashing practices. As illustrated in the table stratum 2 performed better compared to stratum 1 in regard to all wash indicators. Overall 9.0% of the caregivers washed their hands during the 4 critical moments while 32.9% did it using soap and water as recommended.

Table 18: Handwashing in the 4 critical moments

Handwashing practice	County (%)	Stratum 1 (%)	Stratum 2 (%)
After toilet	61.8%	39.5%	85.0%
Before cooking	40.5%	13.3%	68.7%
Before eating	94.1%	91.8%	96.6%
After taking a child to toilet	10.2%	1.5%	19.2%
Handwashing in the 4 critical moments	9.0%	0.5%	17.9%
Handwashing with soap and water	32.9%	18.8%	46.4%

3.7.5. Sanitation Facilities Ownership and Accessibility.

If organic solid waste is not disposed of well, major risks are incurred due to fly breeding and surface water pollution which is a major cause of diarrheal diseases. Solid waste often blocks drainage channels and leads to environmental health problems associated with stagnant and polluted surface water. Analysis of relieving points revealed that, most household are still relieving themselves in bushes and other open places. Open defecation was practiced by 28.9 % of the households. Toilet ownership remained low at 50.8% while 20.4% shared sanitary facilities or used neighbor's toilets to relieve themselves as indicated in figure 19 below.

Table 19: Relieving Points

Relieving points	County (%)	Stratum 1 (%)	Stratum 2 (%)
Open defecation	28.9%	49.5%	8.8%
Neighbors or shared or improved latrine	20.4%	7.7%	32.7%
Own traditional or improved latrine	50.8%	42.8%	58.5%

3.8. Household and Women Dietary Diversity

3.8.1. Household Dietary Diversity

The household dietary diversity score (HDDS) is meant to reflect, in a snapshot form, the economic ability of a household to access a variety of foods. Studies have shown that an increase in dietary diversity is associated with socio-economic status and household food security (household energy availability) (FAO 2010). The HDDS is meant to provide an indication of household economic access to food, thus items that require household resources to obtain, such as condiments, sugar and sugary foods, and beverages, are included in the score. Individual dietary diversity scores aim to reflect nutrient adequacy. Studies in different age groups have shown that an increase in individual dietary diversity score is related to increased nutrient adequacy of the diet. Dietary diversity scores have been validated for several age/sex groups as proxy measures for macro and/ or micronutrient adequacy of the diet.

Household dietary diversity assessment was based on 24 hour recall period. At the data collection, 16 food groups as described in FAO 2010 guideline were used. The groups were combined at the analysis stage to come up with 12 food groups. As shown in figure 12 below, there was a high consumption of 4 food groups namely; Cereals (97.9%), fish (84.9%), vegetables (78.1%) and sweets and sugars (74.4%) Few households (12.1%) consumed eggs.

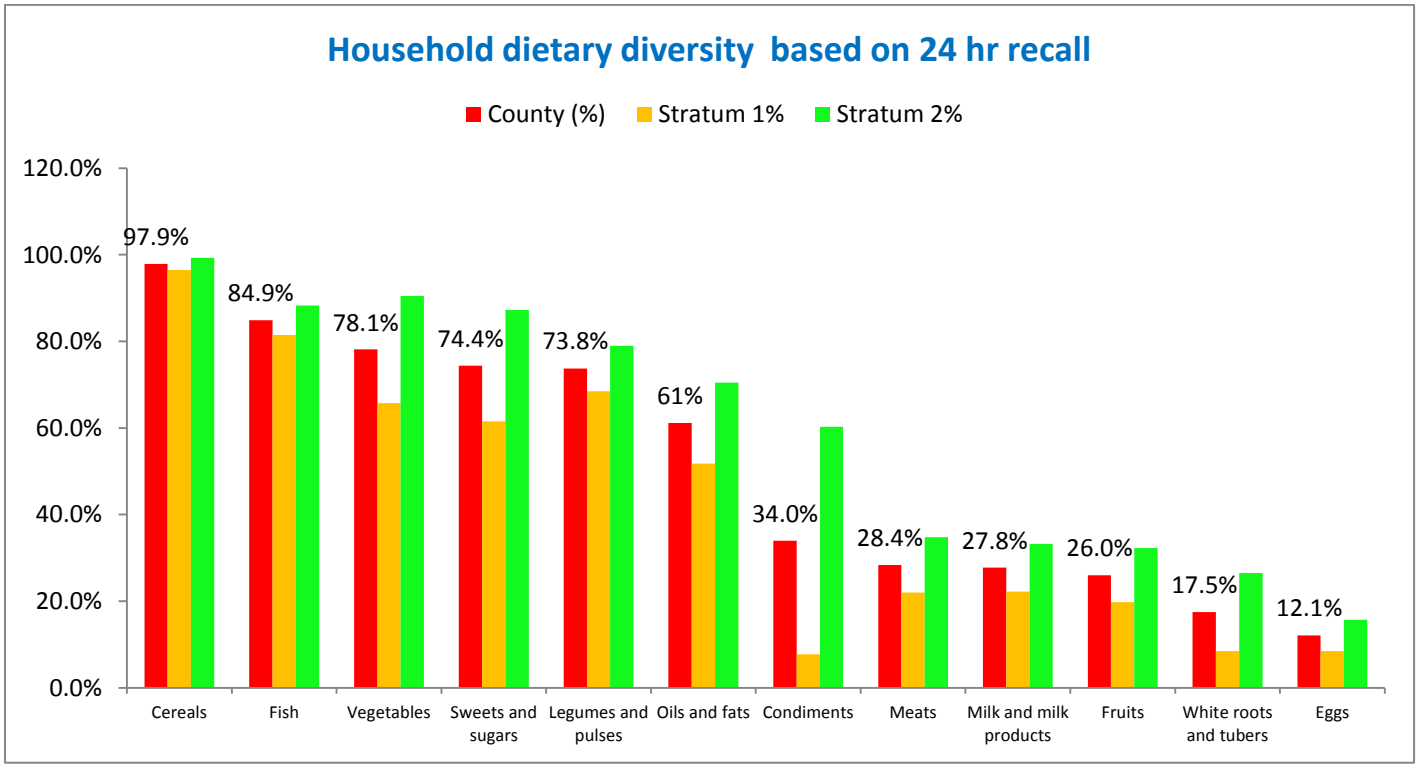


Figure 13: Food consumed based on 24 hrs recall

Majority of the households (59.1%) consumed 5 food groups or more with 23.1% consuming between four and five food groups. Only 17.8% of the households consumed 3 or less food groups as illustrated in table 20 below.

Table 20: Household dietary diversity

Indicator	County (n)	County (%)
Households consuming 3 or less food groups	142	17.8%
Households consuming 4 to 5 food groups	185	23.1%
Households consuming more than 5 food groups	473	59.1%

3.8.2. Women Dietary Diversity

The Minimum Dietary Diversity for WRA (MDD-W) indicator is a food group diversity indicator that has been shown to reflect one key dimension of diet quality: micronutrient adequacy. MDD-W is a dichotomous indicator of whether or not women 15–49 years of age have consumed at least five out of ten defined food groups the previous day or night. The proportion of women 15–49 years of age who reach this minimum in a population can be used as a proxy indicator for higher micronutrient adequacy, one important dimension of diet quality. As indicated in figure 12 below, the most consumed food was grains, white roots and tubers (94.1%) and meats, poultry and fish.

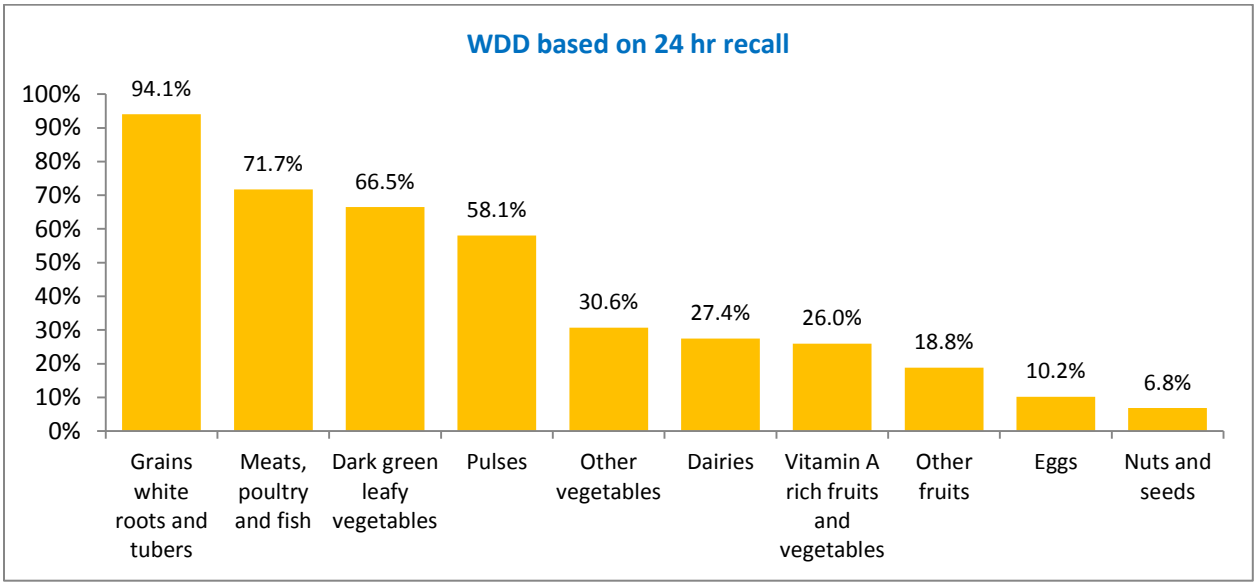


Figure 14: Women dietary diversity

Further analysis shows that 39.2% of WRA consumed at least 5 food groups which is the Minimum dietary diversity for women. The proportion of WRA who consumed 5 food groups was higher in stratum 2 (57.6%) compared to stratum 1(16.2%). The mean number of food groups consumed was 4.2 as illustrated in table 21 below.

Table 21: Women dietary diversity

Indicator	County (%)	Stratum 1 (%)	Stratum 2 (%)
Women consuming at least five food groups	39.2%	16.2%	57.6%
Women consuming less than 5 food groups	60.8%	83.8%	42.4%
Mean number of food groups consumed	4.2	3.2	5.0

3.9. Food Consumption Score

The Food Consumption Score is a composite score based on dietary diversity, food frequency and relative nutrition importance of different food group (WFP 2015). FCS is a proxy for household food security and is designed to reflect the quality of people's diet. The FCS is considered as an outcome measure of household food security. Food consumption score classifies households in to 3 categories namely, poor, borderline and acceptable. In computing FCS, 16 food groups were collapsed to 8 groups namely; cereals, pulses, vegetables, fruits, meats (meats, fish and eggs), dairies, sugars and oils. The frequency of consumption (maximum 7 days) was multiplied by an assigned weight factor i.e. cereals (2), pulses (3), vegetables (1), fruits (1), meats (4), dairies (4), oils (0.5) and sugar (0.5). Food consumption score (FCS) was obtained by summing up the product of each food item after which classification was done as illustrated in table 22 below.

Table 22: Food Consumption Score

FCS Threshold	County	County %	Stratum 1 (n)	Stratum 1 (%)	Stratum 2 (n)	Stratum 2 (%)
Poor (0- 21)	87	10.9%	64	16.0%	23	5.8%
Borderline (21.5-35)	183	22.9%	111	27.8%	72	18.0%
Acceptable (over 35.50	530	66.3%	225	56.3%	305	76.3%

Further analysis was done on diet quality based on vitamin A rich, iron rich and protein rich diets. As illustrated in figure 15 below, 81.5% of households which were classified under poor and borderline categories consume protein rich foods either somehow or frequently , while 83.0% consumed none of vitamin A rich foods, 53.7% and 31.9% somehow and frequently consumed iron rich foods. Among those households classified as acceptable, 91.6% consumed protein rich foods frequently, 74.3% consumed iron rich foods frequently while only 13.3% consumed vitamin A rich foods.

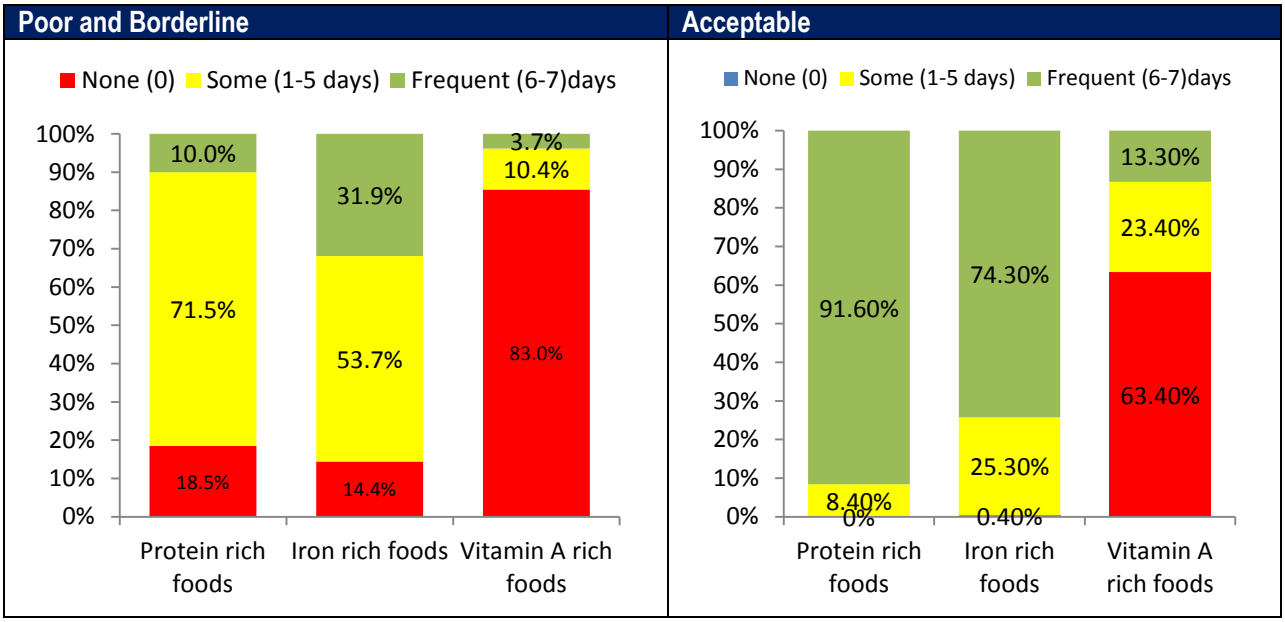


Figure 15: Consumption of micronutrients rich foods

3.10. Coping Strategy

The Coping Strategies Index is a simple and easy-to-use indicator of household stress due to a lack of food or money to buy food. The CSI is based on a series of responses (strategies) to a single question: "What do you do when you don't have adequate food, and don't have the money to buy food?" The CSI combines, the frequency of each strategy (how many times was each strategy was adopted) and the severity (how serious is each strategy). This indicator assesses whether there has been a change in the consumption patterns of a given household. For each coping strategy, the frequency score (0 to 7) is multiplied by the universal severity weight. The weighted frequency scores are summed up into one final score (WFP 2012). 50.3% of household were food insecure in the past 7 days (they at one point lacked food or did not have money to buy food at one point. Stratum 1 was more affected with 61.0% while stratum 2 had 39.5% of the household which were affected by food insecurity. Table 23 below summarizes the coping strategies adopted by the households in such instances

Table 23: Coping Strategy

Coping strategy	No. of households	Frequency score (0- 7)	Severity Score (1-3)	Weighted score
Rely on less preferred or less expensive foods	317	4.6	1	4.6
Borrow foods from relatives and friends	204	2.8	2	5.6
Limit portion sizes	270	4.8	1	4.8
Restriction of consumption by adults so that children can eat	207	4.6	3	13.8
Reduce number of meals	344	4.1	1	4.1
Total weighted coping strategy Score				**32.9**

Further analysis was done on the CSI per stratum. As illustrated in figure 16 below, the CSI for stratum 1 was 39 compared to stratum 2 whose CSI was 32.1.

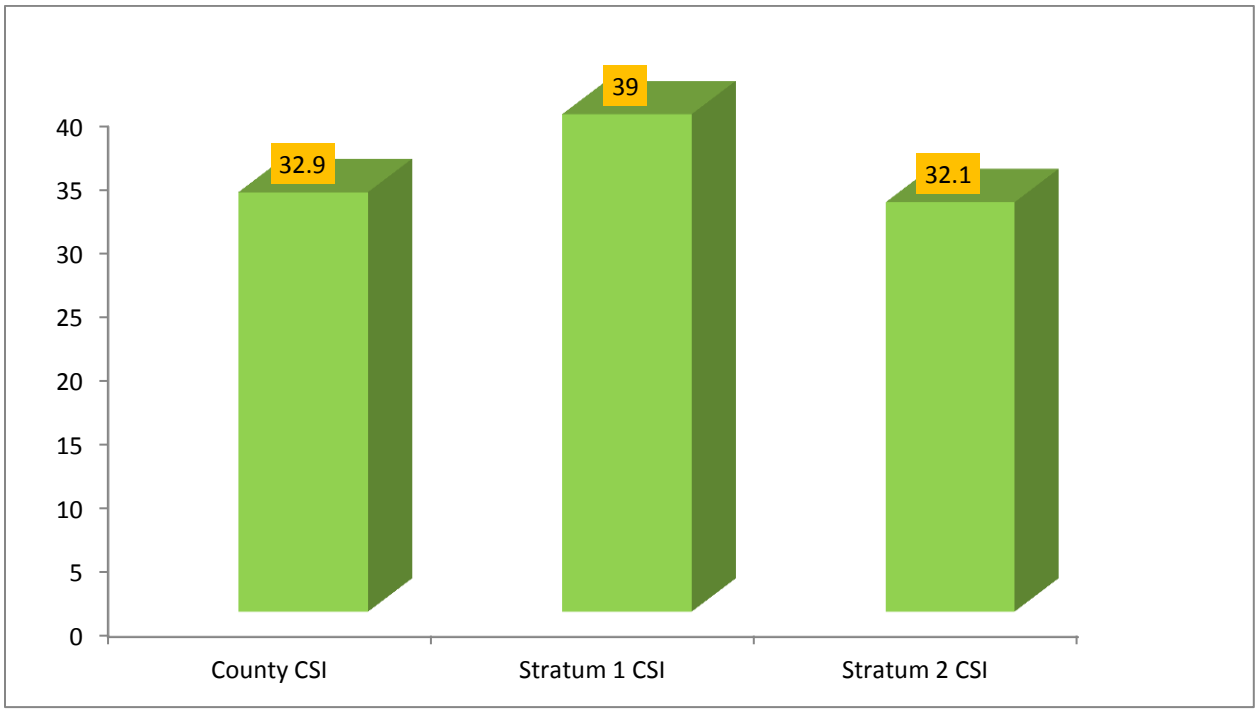


Figure 16: CSI per stratum

4.0. Conclusion and Recommendations

4.1. Conclusion

The survey revealed high chronic malnutrition that persists in the County. Currently (November 2016) chronic malnutrition was 35.9%. Though, there was a notable decline compared to KDHS (2014). Stratum 1 was most affected with a prevalence rate of 46.0% compared to stratum 2 (27.2%). There was a statistical significant difference between the two strata. Chronic factors such as lower enrollment of children in school were revealed in stratum 1.

In terms of acute malnutrition, Kilifi County was doing relatively good at 4.6%. There was no significant difference in prevalence of acute malnutrition in stratum 1 (4.7%) and Stratum 2 (4.6%) (p = 0.9522). The county can be classified at phase 1 (minimal) of IPC classification of acute malnutrition.

Some of the factors attributed to the nutrition status included morbidity. Morbidity was relatively high where at the County level 40.7% of the children were reportedly sick in the past 2 weeks prior to the survey. Stratum 1 was more affected at 48.7% compared to only 33.5% in stratum 1. There was a disparity in vitamin A supplementation at the strata level. Overall twice supplementation was low at 47.4% with statum 1 performing poorer at 31.1%. Overall vitamin A supplementation at the County level for children 6 to 59 months was 71.5%. Like Vitamin A supplementation, deworming of children was a notable gap where only 21.9% of children aged 12 to 59 months were dewormed twice with stratum 1 recording very low deworming rates of 11.4%. There was no MNP supplementation program in the County.

Maternal nutrition status by MUAC recorded impressive performance with only 1.8% of WRA and 2.1% of PLW being malnourished (MUAC< 21.0cm). Stratum 1 however recorded 4.2% compared to stratum 2 which had only 0.7% of PLW who were malnourished. Although majority of women were supplemented with iron and folic acid during their immediate pregnancy, very few took the tablets for the recommended 270 days. At the County level, only 2.2% took the tablet for the recommended number of days. The mean number of days for FeFo consumption was 80.3 days.

The survey also revealed a relatively good food consumption score with 66.3% of the household having acceptable FCS. However only 39.2% of the women met the minimum dietary diversity for women. At the County level, the main food groups consumed included cereals, fish, vegetables, sugar and sweets for WRA, the main food items consumed included grains, white roots and tubers, meats (especially fish) as well as dark green leafy vegetables.

Half of the households surveyed were food insecure in the past 7 days prior to the survey. Such households adopted a number of coping strategies mainly; reducing the number of meals taken as well as relying on less preferred or less expensive foods. Overall, the coping strategy index was 32.9.

4.2. Recommendations

To address the gaps that arose from the survey findings, the following actions were recommended;

Table 24 : Survey recommendations

Findings	Recommendations	ACTORS
The coverage of MNPs is only 2.2% due to absence of Micro nutrient Powders/ programme	**Strengthen micro nutrient programme** Procure and distribute MNPs (from the County allocation to Nutrition Department) to all the 7 sub counties. Initiate and strengthen MNP supplementation for children 6 - 23 months in Kilifi County Sensitize the community on MNPs and their importance	County Government of Kilifi Micro Nutrient Initiative (MI) KRCS APHIA Pwani
Low coverage of Vitamin A (47% twice annually)	Formulate a strategy to reach the children 6 – 36 months Allocating resources for outreaches and the ECD strategy Enhance community/social mobilization & sensitization using • Community Strategy • Outreach Strategy • Malezi Bora	County Government of Kilifi MAP International IMC APHIA Pwani
Low utilization of Iron – Folic Acid Supplementation	Prepositioning, quantification and procurement of IFAs (combined) Encourage pregnant women to do 8 ANC visits Sensitize health workers on the new guidelines that advocate for the 8 ANC visits Sensitize the PHOs/ CHEWs & CHVs on importance of IFAs Sensitize the community on IFAs and ensure that all pregnant women regularly take the same OJT on HINI	County Government of Kilifi UNICEF IMC APHIA Pwani
High prevalence of chronic malnutrition	Community sensitization using the community strategy Implement BFHI in Kilifi County Hospital, Malindi SC Hospital & Mariakani Sub County Hospital Conduct a training on Baby Friendly	County Government of Kilifi PSK IMC APHIA Pwani (Plan)

	Community Initiative targeting • Ganze sub county • Model health facilities (Mtwapa, Matsangoni, Rabai, Gotani) Training of health workers (especially Nutritionists) on MIYCN Finalization and dissemination of the Kilifi County Complementary Feeding Strategy P.D. Hearth and use of kitchen gardens in 2 sub counties • Kaloleni • Magarini Training the community on importance of food diversity Allocating resources for outreaches Enhance community/social mobilization	
Sub optimal hygiene and sanitation practices (open defecation and low coverage for hand washing practices at 4 critical moments)	Strengthen the integration of CLTS to Nutrition Interventions To incorporate the CLTS focal person into the CNTF	County Government of Kilifi SNV PSK
b) Water stress mostly affecting Kaloleni, Magarini and Ganze sub counties	To start water trucking to the most severely affected areas Sensitize the community on rain water harvesting	County Government of Kilifi SNV PSK
c) Water quality concerns (water treatment practices very low in the entire county)	Routine water quality testing	County Government of Kilifi
	Procure and distribute chlorine pots	County Government of Kilifi
	Sensitization of the community on importance of water treatment	SNV, County Government of Kilifi

Appendices

Appendix 1: Plausibility check for: Kilifi Sampled.as

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

Overall data quality

Criteria	Flags*	Unit	Excel.	Good	Accept	Problematic	**Score**
Flagged data	Incl	%	0-2.5	>2.5-5.0	>5.0-7.5	>7.5	
(% of out of range subjects)			0	5	10	20	**5** (3.3 %)
Overall Sex ratio	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**0** (p=0.663)
Age ratio(6-29 vs 30-59)	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**0** (p=0.317)
Dig pref score - weight	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (4)
Dig pref score - height	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (6)
Dig pref score - MUAC	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (6)
Standard Dev WHZ	Excl	SD	<1.1	<1.15	<1.20	>=1.20	
.			and	and	and	or	
.	Excl	SD	>0.9	>0.85	>0.80	<=0.80	
			0	5	10	20	**0** (1.04)
Skewness WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**0** (0.04)
Kurtosis WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**0** (-0.18)
Poisson dist WHZ-2	Excl	p	>0.05	>0.01	>0.001	<=0.001	
			0	1	3	5	**0** (p=0.282)
OVERALL SCORE WHZ =			0-9	10-14	15-24	>25	**5** %

The overall score of this survey is 5 %, this is excellent.

Appendix 2: Clusters Sampled

Stratum 2: Kilifi North, Kilifi South, Malindi and Rabai Sub Counties

COUNTY	SUB COUNTY	WARD NAME	CLUSTER NAME
KILIFI	KILIFI NORTH	KIBARANI	FUMBINI
KILIFI	KILIFI NORTH	KIBARANI	EZAMOYO
KILIFI	KILIFI NORTH	SOKONI	KICHINJIONI
KILIFI	KILIFI NORTH	SOKONI	KIBAONI
KILIFI	KILIFI NORTH	WATAMU	GEDE CENTRE C
KILIFI	KILIFI NORTH	MATSANGONI	MATSANGONI CENTRE
KILIFI	KILIFI NORTH	MATSANGONI	BORA UPANGA
KILIFI	KILIFI NORTH	DABASO	DABASO CENTRE
KILIFI	KILIFI NORTH	MNARANI	MIDZIMITSANO
KILIFI	KILIFI SOUTH	MWARAKAYA	MITULANI
KILIFI	KILIFI SOUTH	CHASIMBA	DINDIRI
KILIFI	KILIFI SOUTH	JUNJU	KADIMUNI
KILIFI	KILIFI SOUTH	MTEPENI	KIDUTANI TUNZANANI
KILIFI	KILIFI SOUTH	MTEPENI	KADZENGO
KILIFI	KILIFI SOUTH	SHIMO LA TEWA	MTOMONDONI
KILIFI	KILIFI SOUTH	SHIMO LA TEWA	MWAVITSWA
KILIFI	MALINDI	SHELLA	NGALA PHASE 5
KILIFI	MALINDI	SHELLA	SEA BREEZE C
KILIFI	MALINDI	MALINDI TOWN	BARANI TOWN D
KILIFI	MALINDI	GANDA	MILIMANI NORTH
KILIFI	MALINDI	GANDA	KIJIWETANGA
KILIFI	MALINDI	JILORE	KATSUHA NZALA
KILIFI	RABAI	RABAI	GANGA B
KILIFI	RABAI	MWAWESA	BEDIDA
KILIFI	RABAI	RURUMA	VIKOLOKOLO

Stratum 1: Magharini, Kaloleni and Ganze Sub Counties

COUNTY	SUB COUNTY	WARD NAME	CLUSTER NAME
KILIFI	GANZE	BAMBA	MGANDAMWANI B
KILIFI	GANZE	BAMBA	BAHARINI
KILIFI	GANZE	SOKOKE	KWADADU
KILIFI	GANZE	JARIBUNI	JEZA
KILIFI	GANZE	GANZE	MWATATE
KILIFI	GANZE	GANZE	TSANGALAWENI NDHUNGU
KILIFI	GANZE	SOKOKE WARD 2	KIZINGO
KILIFI	GANZE	SOKOKE WARD 2	MADAMANI
KILIFI	GANZE	SOKOKE WARD 2	KAEMBENI
KILIFI	GANZE	SOKOKE WARD 2	KACHORORONI
KILIFI	GANZE	SOKOKE WARD 2	KIVA CHA MUNGA
KILIFI	MAGARINI	GONGONI	GARITHE A
KILIFI	MAGARINI	GONGONI	MUNAGONI A
KILIFI	MAGARINI	ADU	MUYU WA KAE C
KILIFI	MAGARINI	ADU	KADZANDANI
KILIFI	MAGARINI	ADU	MUYEYE
KILIFI	MAGARINI	MARAFA	MIZIJINI
KILIFI	MAGARINI	MARAFA	KIROSA
KILIFI	MAGARINI	GARASHI	KANZIMBANI
KILIFI	MAGARINI	MAGARINI	MAMBRUI A
KILIFI	MAGARINI	MAGARINI	MPIRANI A
KILIFI	KALOLENI	KALOLENI	MANYANI
KILIFI	KALOLENI	KALOLENI	MWANDAZA A
KILIFI	KALOLENI	KALOLENI	VISHAKANI C
KILIFI	KALOLENI	MWANAMWINGA	MIGWALENI
KILIFI	KALOLENI	KAYAFUNGO	NDATANI III
KILIFI	KALOLENI	KAYAFUNGO	GOTANI A
KILIFI	KALOLENI	MARIAKANI	NJORO TAKATIFU

Appendix 3: Survey Team

A: Enumerators and Team Leaders

S.No	Name	Sub County	Designation
1	Abel Amani Chivatsi	Kilifi North	Enumerator
2	Lydia Harmony	Malindi	Enumerator
3	Shanny Matheka	Malindi	Enumerator
4	James Maitha	Malindi	Enumerator
5	Sakina Omar Wakio	Ganze	Enumerator
6	Stephen Madenje	Ganze	Team leader
7	Yasmin Ismail	Ganze	Enumerator
8	Philister Mkambe	Magarini	Enumerator
9	Rabecca Mkambe	Kilifi North	Team leader
10	Solomon Mwaniki Muriithi	Kilifi North	Enumerator
11	Japheth Onyango Obura	Rabai	Team leader
12	Purity I David	Kaloleni	Enumerator
13	Kagani Elizabeth	Ganze	Enumerator
14	June Nyadzua Saha	Rabai	Team leader
15	Christine Zawadi Karisa	Kaloleni	Enumerator
16	Thomas Thoya	Rabai	Enumerator
17	Lucy Karimi Murungi	Rabai	Enumerator
18	Lilian Nzomo	Kaloleni	Team leader
19	Reginah Mwangangi	Kilifi South	Enumerator
20	Josephine K. Taura	Magarini	Team leader
21	Esha Adam. A	Malindi	Team leader

B: Coordination/Supervision Team

Kilifi County Department of Health	Ronald. N. Mbunya, County Nutrition Coordinator Kilifi County and the Overall Team Leader
	Amina, Kilifi North Sub County Nutrition Coordinator
Partners Technical/Administrative Support	Denis Mramba, Program Manager, MCNP Project (Kilifi County), International Medical Corps
	Janet Ntwiga, Nutrition Support Officer (Kilifi County); UNICEF
	Salim Athumani; Monitoring and Evaluation officer; International Medical Corps (Tana River County
	Samuel Murage (Nutrition and Dietetics Unit), Ministry of Health
	Mark Murage Gathii; Monitoring and Evaluation Officer-International Medical Corps