CHRISTIAN AID

Report of SMART Nutrition Survey
Narok County, Kenya.

July 2013

By

A SMART Nutrition Assessment report prepared by SMART STAT Consultants Ltd. for Christian Aid, Kenya.

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Acronyms and Abbreviations

CI	:	Confidence Interval
EBF	:	Exclusive Breast Feeding
FGDs	:	Focus Group Discussions
FSL	:	Food Security and livelihoods
GAM	:	Global Acute Malnutrition
HFA	:	Height for Age
HH	:	Household
IMAM	:	Integrated Management of Acute Malnutrition
IYCF/N	:	Infant Young Child Feeding/Nutrition
MAM	:	Moderate Acute Malnutrition
MCH	:	Maternal Child Health
M&E	:	Monitoring and evaluation
MoH	:	Ministry of Health
MUAC	:	Mid-Upper Arm Circumference
NGO	:	Non-Governmental Organization
OTP	:	Outpatient Therapeutic Feeding Programme
PPS	:	Probability Proportionate to Size
SAM	:	Severe Acute Malnutrition
SC	:	Stabilization Center
SD	:	Standard Deviation
SFP	:	Supplementary Feeding Programme
SMART	:	Standardized Monitoring and Assessment of Relief and Transition
U5MR	:	Under-5 Mortality Rate
UNICEF	:	United Nations Children‘s Fund
WASH	:	Water, Sanitation and Hygiene
WFA	:	Weight for Age
WFH	:	Weight for Height
WHO	:	World Health Organization

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Thanks must also go to the Ministry of Health for their support and also the local administration that provided valuable information to the field teams during field work. Very special thanks also goes to the Nutrition Information Working Group (NIWG) team in Nairobi for their tireless efforts to ensure that the data collected was of the highest quality and of their technical support. The same goes to UNICEF who provided the equipment for the anthropometric measurements and technical insights. Last but not least is much appreciation to the survey enumerators and drivers for facilitating the collection of field data in sometimes very inhospitable environments.

Our final thanks go particularly to the innumerable Narok County women and their children, whose cooperation and contribution provided the substance for this report, and above all, the many individuals who, in different ways, made this survey a success.

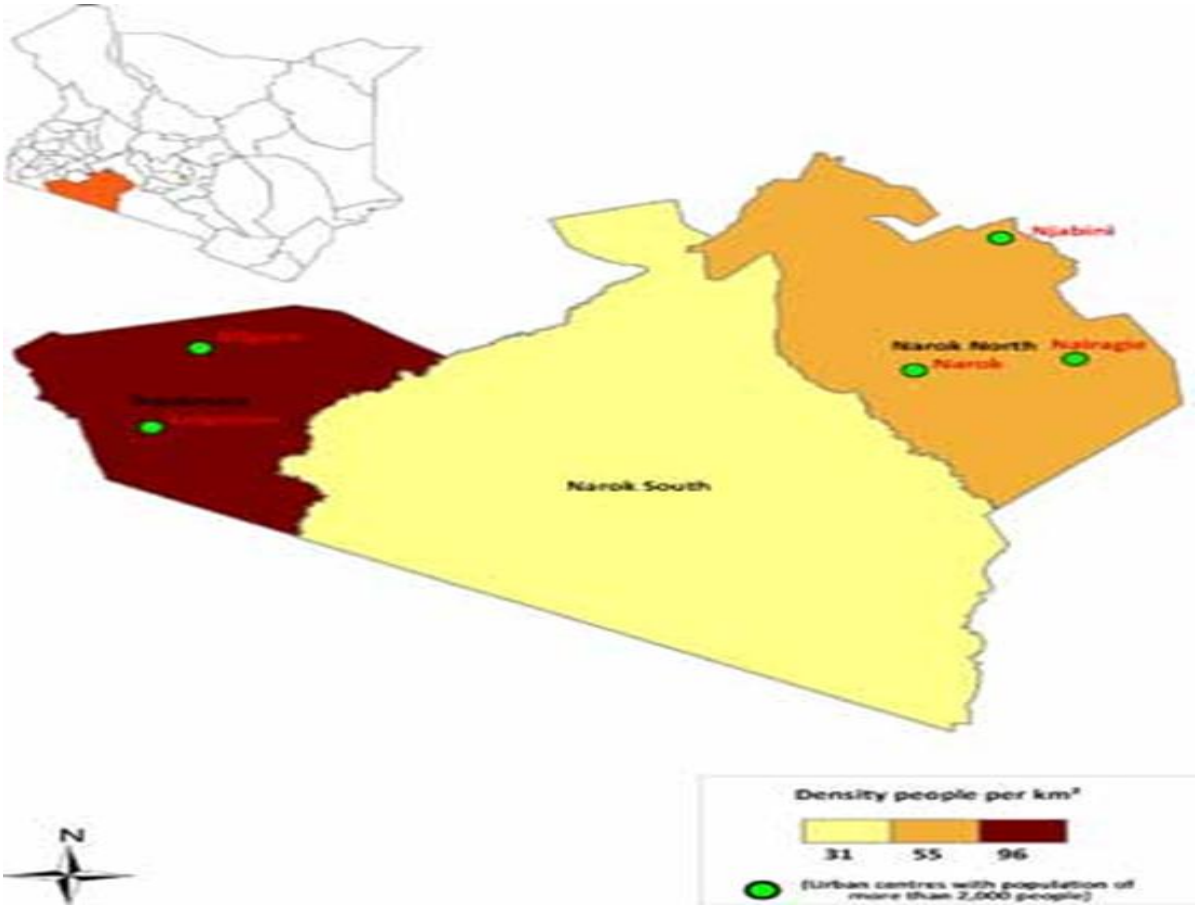
Survey Consultants.

EXECUTIVE SUMMARY

This survey was conducted between the 17th and 24th of June 2013 in Narok County. The purpose of the survey was to determine the nutritional status of children aged 6-59 months and the caregivers of these children. This was the first nutrition survey to be undertaken in the County and hence the results provided the baseline indicators for the County. The county has a population of 850,920 people according to the 2009 National population census estimates. The survey training was done from the 12th to the 15th of July 2013 and data collection took place from the 17th to the 24st of July 2013. The survey was conducted by SMART STAT Ltd. on behalf of Christian Aid Kenya.

Narok County is classified as an agro-pastoral area and hence the major economic activities for the people in the county include pastoralism and agricultural activities. The County is divided administratively into 3 districts i.e. Narok North, Narok South and Transmara districts. Narok is predominantly inhabited by the Maasai people. Other minority groups inhabiting the county include the Kalenjins, Kikuyus and Kisii people. The Maasai practice a pastoral lifestyle and mainly inhabit the Narok South and Narok North districts while the Kalenjin and the Kisii who practice an agricultural lifestyle are mainly in Transmara and parts of Narok South districts. The Kikuyu people are predominantly clustered in the urban areas of the three districts.

The following is a map of Narok County.



Methodology

The survey was conducted using the Standardized Monitoring and Assessment of Relief and Transitions (SMART) methodology and recommended nutrition survey key indicators to assess the anthropometric indicators in the county. The survey adopted a three-stage cluster sampling with probability proportional to size (PPS) design.

Sample size was determined on the basis of estimated prevalence rates of malnutrition (GAM) of Kajiado County in 2012 since the two regions are similar in geographical and socio-cultural characteristics, a precision of 3% and a design effect of 2 were used. The sample required for children aged 6-59 months was 576 children who were to be obtained from 719 households. The sample size for the children aged 6-23 months and 0-5 months was 245. The IYCF multi survey sampling calculator was used to calculate the sample size for the IYCF group. For the qualitative data, it was collected through focus group discussions (FGDs), key informant interviews and literature review.

The survey targeted 48 sampled clusters. In total, 844 households were sampled for the survey where 1109 children aged 6-59 months were taken anthropometric measurements. Additionally, 444 children aged between 6-23 months and 268 children aged between 0-5 months were included in the assessment of infant and young child feeding practices.

Household selection adopted improved EPI method to ensure that the survey was unbiased and randomized. Anthropometry, infant and young child feeding practices and maternal health questionnaires were administered until the daily quota (15 households per day) for each cluster was successfully obtained.

N.B: The sample size was slightly larger and exceeded the target because of the integrated nature of the survey where the MCH survey required visiting at least 20 households per day. Since the teams were grouped together, i.e. the Nutrition and MCH teams, the team work required visiting 20 households per day as opposed to the 15 households targeted daily.

Summary Results

Anthropometric survey

The survey reveals that the GAM based on the Weight-For-Height Z Scores and/or oedema in Narok County was at 7.7% (n=85) (5.3 – 11.0, 95% CI) which is classified as moderate[1] based on the WHO standards. The results further reveal that the prevalence of the severe acute malnutrition (SAM) among the children aged 6-59 was found to be 4.4% (n=49) (2.7 – 7.3, 95% CI) which is classified as an emergency level[2]. The results also showed that the prevalence of oedema among the children was 3.6% (n=40) which indicated the severe acute malnutrition (SAM) situation of the children was critical. The oedema cases were mainly clustered in Transmara district.

[1] WHO cut off points for wasting using z score (-2 z scores in populations: <5% - acceptable; 5-9% - poor; 10-14% - serious; >15% - critical)

[2] Emergency level for SAM > 4%

Table 1: Summary of Findings

Demography	Number
Number of HH surveyed	844
Number of children 6-59 months surveyed	1109
Number of children 0-23 months surveyed for IYCN	444
Number of children 0-5 months surveyed for EBF	268
Proportion of under 5 years (%)	18
Average under 5 per HH	3

Characteristic	N	n	% (95% CI)
Overall GAM (WFH <-2 Z score or presence of oedema) - WHO 2006	1109	85	7.7 % (5.3 – 11.0, 95% C.I.)
Overall SAM (WFH <-3 Z score or presence of oedema) - WHO 2006	1109	49	4.4 % (2.7 – 7.3, 95% C.I.)
Overall underweight (WFA <-2 Z score or presence of oedema) – WHO	1069	135	12.6 % (9.7 - 16.3, 95% C.I.)
Overall Severe underweight (WFA <-3 Z score or presence of oedema)-WHO	1069	25	2.3 % (1.5 – 3.6, 95% C.I.)
Overall Stunting (HFA <-2 Z score)- WHO	1109	309	27.9 % (23.2 – 30.0, 95% C.I.)
Overall Severe stunting (Height for age <-3 Z score) -WHO	1109	103	9.3 % (6.9 – 12.4, 95% C.I.)
Vitamin A supplementation coverage	622		52.7%
Measles coverage	1034		52.6%
Proportion of children introduced to timely breast feeding	268		80.6%

Conclusion

The general nutrition status in Narok County is classified as medium as per the WHO guidelines for the global acute malnutrition (GAM) - 7.7%, stunting- 27.9% and underweight- 12.6%. However, the severe acute malnutrition (SAM) level is classified as critical- 4.4%. This is attributable to the 40 cases of confirmed bilateral pitting oedema cases observed during the survey.

Both the Vitamin A supplementation, deworming and measles coverage fall below the 80% national targets which call for intensified and concerted efforts to scale up such activities within the county.

Recommendations

- Immediate and targeted nutrition interventions through increase of community mobilization and outreach and a fully functional stabilization component with nutritional supplements to try and curb the high case load of severe acute malnutrition cases. This should be accompanied by a strengthened OTP services in the county;
- Enhanced Vitamin A and measles coverage in the county.
- There is need for a multi-faceted approach in addressing causes of malnutrition in the county. This would involve concerted efforts by the multiple actors tackling various nutritional and health challenges at multiple levels;

- Enhanced support on sanitation, hygiene especially hand washing, dietary diversity and complementary feeding;
- Support for economic empowerment and to reduce the poverty levels through enhanced and modernized food production;
- Strengthen the IMAM component at the facility level by improving capacity building of the community health workers and also to strengthen the referral system on cases of malnutrition.
- Support for sustainability strategies in the public health services provision through strong focus on local health policy development and health service infrastructure development.

1.0 Introduction

Christian Aid is an NGO whose mission is to alleviate poverty from the society and support and empower the people to be self-sufficient and self-reliant. The organization has invested in sustainable projects and programmes all over Kenya aimed at alleviating poverty and supporting areas such as livelihoods improvement, health, nutrition, justice, civil societies etc. in order to provide a holistic support and empowerment of the society. Currently, Christian Aid has focused its operations in Narok County to support a Maternal and Child Health (MCH) programme running for four years which has a nutrition component in it. Based on this programme, Christian Aid proposed to undertake a baseline survey to establish the current situation before the intervention.

Narok County is located on the South Rift Valley on the north of Tanzania; it borders six counties with Nakuru to the North, Bomet, Nyamira and Kisii to the North West, Kajiado to the East and Migori to the West. The county is very vast and covers 17,933 km2 being 11th in size among all the 47 counties in Kenya. However, the area is sparsely populated with a density of 47 people per km2and 34th in the country. According to the National Census (2009), Narok County has a population of 850,920.

Narok County is subdivided administratively into 3 districts i.e. Narok North, Narok South and Transmara districts. The primary sources of livelihood are the agriculture that is livestock rearing and crop growing. The main animals reared are cattle and goats while the crops are wheat, maize, beans, Irish potatoes, barley, sorghum and sweet potatoes.

There are 4 district hospitals in the county, 1 in Narok North district, 1 in Narok South district, 1 in Transmara East and 1 in Transmara West district. There are several health facilities i.e. health centers, dispensaries, and clinics, but not all of them are functional due to lack of adequate and skilled staff to run the facilities. Some of the facilities are sponsored by Non-governmental organizations (NGOs) and managed by limited number of skilled personnel.

The major causes of ill health are poor nutrition, very poor health-seeking behavior, low awareness of preventive health and limited health facilities that are fully operational. The most prevalent diseases are upper respiratory tract infections, clinical malaria, measles, diarrhea, pneumonia and typhoid.

The main sources of water for the communities in the County are rivers, water pans, shallow wells and boreholes. Only urban dwellers are able to access clean tapped water and are able to treat the water for consumption. A majority of the rural population practice open defecation and do not have access to latrines.

Survey Justification

There had been neither SMART Nutrition Survey that had been conducted in any of the three districts of Narok County. Based on this, Christian Aid proposes to undertake an integrated nutrition survey in the area in close liaison with the county stakeholders who includes the Ministry of Health, CHP, TRDP, NIDP and Anglican Church of Kenya

1.1 Survey Objectives

From a broad perspective, the survey aimed to estimate the level of acute malnutrition among the children aged 6 to 59 months of age in Narok County. Specifically the survey was premised on the following objectives;

1. To assess the prevalence of acute and chronic malnutrition (wasting, underweight and stunting) among children aged 6-59 months in Narok County.
2. To measure the IYCN indicators including the exclusive breastfeeding (EBF) rate, Minimum Meal Frequency, Minimum Dietary Diversity and timely Initiation to EBF among others.
3. To estimate the coverage of Measles, deworming and Vitamin A supplementation.
4. To estimate the nutritional status of female caregivers aged 15-49 years using MUAC measurements.

2.0 Methodology

2.1 Study site

Narok County is located on the South Rift Valley and the County is divided administratively into 3 districts i.e. Narok North, Narok South and Transmara districts. Narok is predominantly inhabited by the Maasai people. Other minority groups inhabiting the county include the Kalenjins, Kikuyus and Kisii people. The Maasai practice a pastoral lifestyle and mainly inhabit the Narok South and Narok North districts while the Kalenjin and the Kisii who practice an agricultural lifestyle are mainly in Transmara and parts of Narok South districts. The Kikuyu people are predominantly clustered in the urban areas of the three districts.

2.2 Sampling frame

The sampling frame for this survey was the current list of all the villages within Narok County which was accessible. The list contained the villages with their current population estimates. The target population for the survey was children aged 6 – 59 months for the anthropometric component and the female caregivers of children aged 0-23 for feeding practices.

2.3 Study design and sampling

A three-stage cluster sampling design was used to assess the nutrition situation for children aged 6 – 59 months in Narok County. The survey utilized a three stage cluster sampling using the SMART methodology. The first stage sampling was the selection of clusters at the sub location level which was done using the probability proportional to population size (PPS). The second stage sampling involved the selection of the villages within the selected sub locations and finally the third stage was conducted to determine the actual household to be included in the survey which was done using the modified EPI method. This method required that at each cluster, the team located and begun from the center of the cluster and randomly determined a direction for surveying by spinning a pen. Enumerators then walked in the direction shown by the tip of the pen until they reached the end of the village. Once again, the team used the pen this time spinning until the pen points to a direction within the boundaries of the village. The team then walked along this second line counting each house on the way. The first house was then randomly selected.

In order to achieve the set objectives, this study used data on village population. Data was collected from 48 villages in the county with 15 households sampled per village for a total sample of 844 households. However, the number of households sampled per village was adjusted upward to 20 to incorporate the MCH baseline Survey that was in the progress. The design allowed for tabulation of child and household level indicators that are representative of the entire assessment area.

NB: A household was defined *as people represented by one caretaker and eating from the same' cooking pot')*

Data collection methods

Household questionnaires: The consultants adapt standardized tools developed by Ministry of Health, Kenya and UNICEF. To estimate malnutrition prevalence and IYCF the following information was collected:

- Anthropometry (weight, height, oedema, MUAC, age, sex) for children aged 6-59 months and MUAC for caretakers
- For children aged below 23 months, IYCF data were equally be collected

The variables were assessed as follows:

- ***Age*** – An intensive discussion on the current events (using Event Calendar) in the county was drawn and agreed upon to assist on the age determination.
- ***Weight measurements*** – Both the Salter scales and the bathroom scales were used during the survey. For the salter scale, when taking the weight, the scale was hang from a strong beam/branch.). After this the weighing pants was placed on the scale and the scale zeroed to factor the weight of the pants as they were used to determine the children's weight. The scales were first checked for correct calibration by using an item of known weight (2kg flour). After every 3-5 weight readings, the calibration of the scales was again checked for accuracy. Two of the research assistants weighed the child and the other recorded the data and repeats what they heard from the one who took the measurements.
- ***Height measurements*** - The height measurements were taken lying down for children less than 2 years or less than 87cm, while children 2 years and older had heights taken

standing up. The children's bodies were placed in the middle of the board ensuring the head; back, knees and back of feet are in contact with the board so that the children's readings are taken while they are straight. Readings were taken to the nearest 0.1 cm.

- ***Mid-Upper Arm Circumference (MUAC)*** - MUAC was taken for children aged 6 to 59 months. It was taken on the left hand. The protruding end of the shoulder bone and the elbow bone were established and the midpoint was located and marked. This was where the MUAC tape was placed round the arm (while the arm was straight, not too tight or too loose). The reading was then made and recorded to the nearest 0.1cm.
- ***Oedema*** - For oedema to be of nutritional importance this was done on both feet. Light pressure was applied with both thumbs to the top part of the foot near the ankles. The pressure was held for 3 seconds (equal to counting one thousand and one, one thousand and two, and one thousand and three). If oedema existed, an imprint was left for a few seconds as a sign of fluid being pushed out of the area of pressure. Such children were referred to the nearest health facility immediately.

Sample Size Calculation

The anthropometric sample size was calculated using the SMART Survey calculator. The following parameters were used. However, for the GAM estimate, since there has been no nutrition survey conducted in the area, the parameter used is the GAM estimate for Kajiado which has similar geographical and social-cultural characteristics as recommended by the SMART Methodology. The population estimates were obtained from the DHIS projected population figures. This is outlined below:

1. Prevalence of GAM – 6.5%
2. Design Effect – 2.0

Table--: Anthropometric and mortality sample size calculation

Data entered on ENA (Delta) software	Anthropometric sample
Estimated prevalence	6.5
Desired precision	3
Design effect	2
Average household size	5
Percent of under five children	18
Households to be included	719
Children to be included	565
Households target per day	15

Sample size calculation for Infant and Young Child Feeding Indicators:

For the Infant and Young Child Feeding Practices (IYCF), all infants less than 6 months of age and children aged 6-23 months will be selected from the sampled households in each of the sampled villages. The sample size computation for the IYCN was as shown in the following table:

Indicator	Estimated prevalence	± desired precision	Design effect	Sample size in no of children	Average household size	% children under 5	% non-response households	Households to be included
EBF	50	8	1.50	245				
Narok County	50	8	1.5	245	5.0	18.0	3	701

Questionnaire administration: In emergencies, the standard practice is to collect data on all children of the target range (6 – 59 months) who live in a household selected for sampling. This protocol helps to ensure that children are not excluded from sampling due to sickness and allows a child currently living in the household but not present at the time of sampling is followed up. For the multi stage cluster design, the required number of children (6-59 months in the households sampled in the county were 565. Data collections in the sampled village were only considered complete when data was collected on a minimum of 245 children (0-23 months) and a total of 719 households. The child section of the questionnaire was administered as many times as there were children of the target age range living in the household while the household section of the questionnaire was administered once at each household selected for sampling.

Secondary Information

Based on the above findings from the survey, more information was sought to triangulate and verify this data. This was achieved using various methods to seek out secondary information which was qualitative in nature which mainly focused on the following thematic areas:

a) Food Security situation in Narok County.
b) Water Sanitation and Hygiene (WASH) situation in the County
c) Malnutrition trends of malnutrition in the county.
d) Health and morbidity patterns in the county.
e) Attitude and perception on malnutrition at the community level.

Tools for data collection.

Various tools and methods were used to capture this information. This included the following:

- **Literature review**

  This entailed reviewing the existing reports and information on the thematic areas of concern. This method was very reliable for developing the historical perspective of the current situation and to provide a background check on the thematic areas of concern i.e. food security, water sanitation and hygiene and on the existing interventions and projects working on the same areas.

- **Key Informant Interviews (KII)**

  The KII approach was effective to get a range of in-depth views on the challenges and positive aspects of the themes of concern and help identify lessons learned, conclusions and recommendation. It's was administered to particular individuals who are resourceful or experts in specific areas and hence their information can be used to generalize over others. These included:

  - District Medical of Health, County Public Health officer of the three districts to determine the general health status, morbidity and mortality trends in their respective districts.
  - District Nutrition Officers of the three districts and various N.G.Os to determine the general malnutrition trend in their respective districts.
  - Officials in the Ministry of Agriculture, National Drought Management Authority (NDMA)- Narok County, Arid Lands- Narok to determine the general food security status of the population.
  - Officials from the Ministry of Water, County Water officer, County Public Health officer who provided insight on the current water, hygiene and sanitation practices in Narok County.

  An open ended questionnaire was administered which revolved around the aforementioned thematic areas of concern.

- **Focus Group Discussions**

  This method involved open ended discussions with a homogeneous group (caregivers of the children < 5 years, pregnant or lactating mothers) of between 8-12 individuals who had similar interests. A set of questions are also used to guide the discussions which are supposed to be as open as possible so that honest responses of the current situation within the community can be extrapolated from the discussions. One person guided the discussions while another person record the information generated.
  These villages were purposively selected due to the high rates of malnutrition observed as evidenced by the oedema cases.

2.4 Team selection

The survey team was comprised of 18 enumerators who were selected from a vigorous and highly competitive interview. Experience, skills and geographical representation from the county were among the qualities considered during the interview process.

The survey team comprised of the 18 enumerators, 2 consultants who managed the overall survey and three District Nutrition Officers from the three districts in Narok County who served supervisors and were assisted by three officials from the partner organizations working with Christian Aid. The enumerators were then divided into 6 teams, each comprising of 3 enumerators. Each team had a team leader selected purposefully by virtue of their experience in data collection and also exhibited leadership qualities. Most of the survey enumerators had experience in data collection, since they had participated in a number of surveys before. The team was designated to carry out the survey in clustered villages.

2.5 Training and supervision

The survey was coordinated and supervised by Martin N. Njoroge and Joseph Njuguna with the support of Christian Aid and the involvement of the Ministry of Health, Narok County. For data collection, a total of 18 enumerators were recruited and trained for the survey. The training was conducted in 4 days which included rigorous training on nutrition where accuracy and precision was emphasized.

The anthropometric standardization exercise[3], as recommended by the SMART methodology, was used as an assessment of the team members' anthropometry techniques. The training had a standardization exercise which established accuracy and precision of the enumerators with respect to the supervisor's values. After the class room training, a practical field experience was conducted on the last day of training, in one of the unselected clusters to take anthropometric measurements of children and caretakers, conduct interviews and fill questionnaires. The pre-testing exercise facilitated deeper understanding of the structure and outlook of the questionnaire. The exercise also ensured the enumerators were sufficiently confident to take the survey.

The local events calendar was used and how to ask the questions in the questionnaires practiced.

Each team was supervised on a daily basis by the supervisors throughout the data collection and occasionally by the consultants. At the end of each day at base, there was a de-briefing session and review of questionnaires.

The following topics were covered during training: survey objectives, SMART survey and sampling methodologies verbal interpretation of the questions into the local languages during training for uniform contextual understanding by all the teams, household and child questionnaire interviewing techniques, anthropometric measurement procedures, practically conducting interviews and anthropometric measurements, interview techniques, duties and responsibilities, research ethics, community entry behavior and survey logistics.

2.6 Data quality control

The use of anthropometric standardization and a cluster control sheet, thorough enumerator training, close supervision by the consultants during the actual survey for consistency, completeness and clarity of the questionnaires ensured that data collected was of good quality. Common local events listed in the seasonal calendar like holidays, important and memorable persons, conspicuous events, were used to clarify the dates of childbirth in cases where the mother or other caretakers were not certain about such information. Questionnaires obtained at the end of each day were checked for completeness. Any errors, omissions in data recording were sorted and corrected.

The anthropometry data was entered every evening so as to perform the plausibility tests where quality issues were highlighted and the information relayed to the teams the next day before they left for the field.

The data was also sent to the Nutrition Information Working Group (NIWG) in Nairobi for close monitoring of the data quality.

3 SMART Regional Training Kit for Capacity-Building and Methodology 2010

2.7 Ethical considerations

The study was reviewed by Christian Aid- Kenya and Ministry of Health staff. The enumerators took anthropometric measurements and asked general questions about infant and young child feeding practices with a view of identifying cases of malnutrition. These questions however did not pose any risk to the participants.

Field team members were especially cognizant of the importance of informing local administration and local service providers at the various sites about the study and the purpose of the research, and assuring respondents and staff that their confidentiality will be respected. Before beginning field work, researchers conducted information session with service providers at the sites before commencing data collection in order to introduce the project and answer any questions. Every respondent was informed of the right to refuse the interview, or to refuse to answer specific survey questions. In this survey, the interviewers respected this right and verbally administered informed consent before conducting the interviews.

For increased validity and to assure respondents' privacy, the interview with each respondent was conducted in a manner that was comfortable for them, and in which they were able to speak openly and honestly. All interviews were conducted within the respondent's home and in a private area taking into consideration and respecting the cultural norms. Younger children in some instances were allowed to be present during the interview. In instances where the respondent indicated that she or he is uncomfortable holding the interview at home, the interview was then held at another location of the interviewee's preference.

2.8 Limitation of the study

The study also acknowledges possibilities of recall bias which could have affected data quality. Recall of age, deworming and vitamin A supplementation may be inaccurate in some cases although every effort was made to obtain accurate data by use of age charts and use of vitamin A supplementation capsule and de-wormer tablets.

Data analysis

Anthropometric data entry, processing and analysis was carried out using ENA (Delta 2011) for SMART software. Data on vitamin A supplementation, measles, de-worming, Infant and Young Child (IYCF), were entered and analyzed using SPSS software version 17.0.

The secondary data was analyzed through content analysis using emerging themes and issues highlighted by different stakeholders to generate a detailed report on issues related to malnutrition. Qualitative data was first transcribed, summarized and thematically analyzed according to the specific objectives. The analysis process entailed:

- Content analysis of information gathered from secondary data sources (desk reviews);
- Manual analysis of qualitative data from KIIs, which included coding, summarizing, categorizing, direct quoting and comparisons;

Categorization and recording the information collected as per the laid out format and then analyzing them by end of the day. The findings were then summarized in terms of the various malnutrition as well as water and sanitation and food security emerging themes

3.0 FINDINGS AND DISCUSSIONS

3.1 Household Demographic Characteristics

In total, 1109 children aged 6 to 59 months were taken their anthropometric measurements. Among these children 444 were aged 6 to 23 months and hence their caregivers were interviewed for the IYCN component to assess both their own dietary practices and their children. Additionally, all the caregivers of the children aged 6 to 59 months were assessed for malnutrition using the MUAC tapes. The demographic characteristics is represented in the table below:

Table 2: Demographic Characteristics

Demography	Number
Number of HH surveyed	844
Number of children 6-59 months included in Anthropometric	1109
Number of children 0-23 months surveyed for IYCN	444
Number of children 0-5 months surveyed for EBF	268
Proportion of under 5 years	18.0%
Average under 5 per HH	3
Average number of persons per HH	5

3.2 Distribution of sample by sex and age

The results of the anthropometric survey are based on the WHO standards 2006. Additionally, the global acute malnutrition is defined as the <-2 z scores weight-for-height and/or oedema while the severe acute malnutrition is defined as <-3 z scores weight-for-height and or/oedema.

Table 3: Distribution of Age and Sex of Sample

	Boys		Girls		Total		Ratio
AGE (mo)	**no.**	**%**	**no.**	**%**	**no.**	**%**	**Boy: girl**
6-17	171	51.0	164	49.0	335	30.2	1.0
18-29	142	50.4	140	49.6	282	25.4	1.0
30-41	130	56.5	100	43.5	230	20.7	1.3
42-53	93	50.3	92	49.7	185	16.7	1.0
54-59	34	44.2	43	55.8	77	6.9	0.8
Total	570	51.4	539	48.6	1109	100.0	1.1

The results of the survey showed that 51.4% (n=570) were boys while 48.6% (n=539) were girls. The overall sex ratio was 1.1 which is an evidence of an un-biased sample since the recommended range of sex ration is 0.8-1.2[4]. Additionally, the results show that the sex ratio

[4] Assessment and Treatment of Malnutrition in Emergency Situations, Claudine Prudhon, Action Contre La Faim (Action Against Hunger), 2002.

across the age groups was within the recommended range besides the age group 54-59 months where there were more girls than boys.

3.3 Nutrition Status of Children aged 6-59 Months

3.2.1 Wasting

Wasting is a form of acute malnutrition which is classified into either severe acute malnutrition (SAM) or moderately acute malnutrition (MAM). Further, when the SAM and MAM are combined together they produce an indicator known as the global acute malnutrition (GAM). Both SAM and MAM are determined by the patient's degree of wasting. In addition, all cases of bi-lateral oedema are categorized as SAM. Wasting is detected using the weight-for-height/length z-scores, the mid-upper-arm-circumference and the presence of oedema. Using the z-scores, a child is classified as a GAM case if the z-score is less than -2 z-score. Using the MUAC tape, a child is classified as a GAM case if the MUAC is less than 125 mm.

Table 4: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

	All **n = 1109**	Boys **n = 570**	Girls **n = 539**
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(85) **7.7 %** (5.3 - 11.0 95% C.I.)	(53) 9.3 % (6.5 - 13.2 95% C.I.)	(32) 5.9 % (3.5 - 9.9 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(36) **3.3 %** (2.0 - 5.2 95% C.I.)	(24) 4.2 % (2.5 - 6.9 95% C.I.)	(12) 2.2 % (1.2 - 4.2 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(49) **4.4 %** (2.7 - 7.2 95% C.I.)	(29) 5.1 % (3.0 - 8.4 95% C.I.)	(20) 3.7 % (1.9 - 7.3 95% C.I.)

The prevalence of oedema is 3.6 % (N= 40)

The above table presents the results of the global acute malnutrition among the children aged 6-59 months in Narok County. According to the results, the overall prevalence of global acute malnutrition (GAM) based on the Weight-For-Height Z Scores and/or oedema was 7.7% (n=85) (5.3 - 11.0 95% C.I.) which is classified as medium[5] based on the WHO standards. Additionally, the prevalence of the severe acute malnutrition (SAM) among the children aged 6-59 was found to be 4.4% (n=49) (2.7 - 7.2 95% C.I.) which is classified as an emergency level[6]. Based on the above results, then the nutrition status in Narok County is classified as moderate based on the GAM rate but critical based on the SAM rates. The high SAM rate is majorly contributed to the 40 oedema cases that were observed and verified by the various District Nutrition Officers who were acting as supervisors during the survey.

The following table shows the distribution of acute malnutrition and oedema based on weight for height z- scores:

[5] WHO cut off points for wasting using z score (-2 z scores in populations: <5% - acceptable; 5-9% - poor; 10-14% - serious; >15% - critical)

[6] Emergency level for SAM > 4%

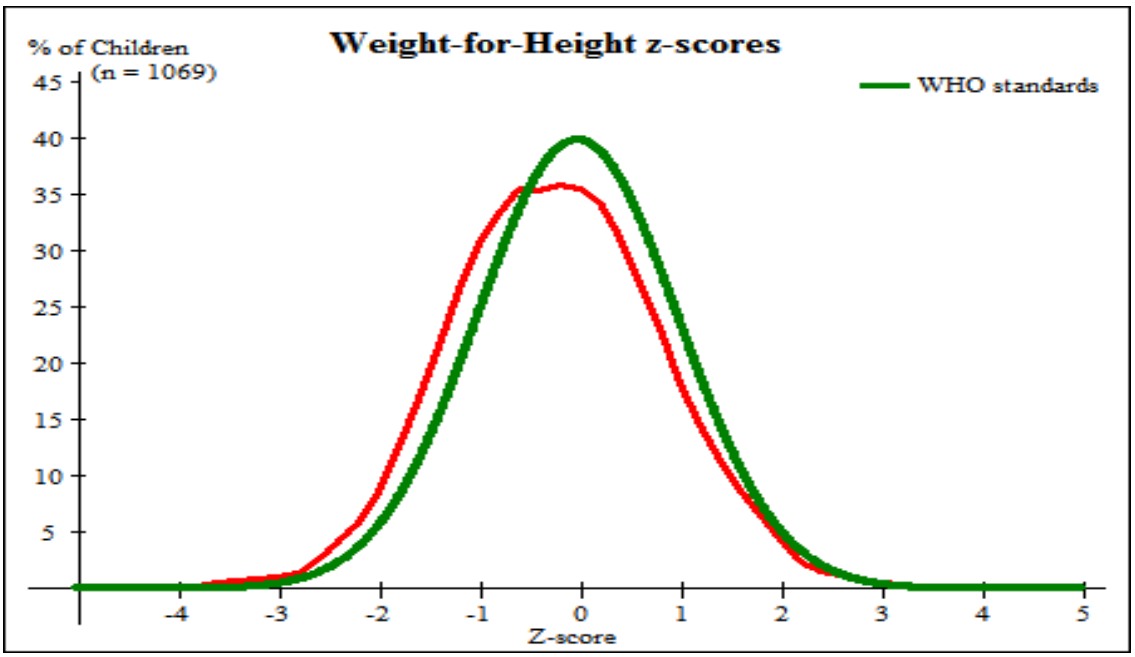
	<-3 z-score	>=-3 z-score
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 40 (3.6 %)
Oedema absent	Marasmic No. 9 (0.8 %)	Not severely malnourished No. 1060 (95.6 %)

The results of the survey also showed that there was a slight difference in the level of malnutrition among the boys when compared with the girls. This was attributed to the socio-cultural factors where the boys are given the responsibility of tending to the livestock at a young age leaving him to eat fewer meals and wild fruits while outdoors. This is unlike the young girls who are usually left at home to do household chores and therefore are able access the meals more easily. The results also showed that the prevalence of oedema among the children was 3.6% (N=40) implying that there was many oedema cases that was detected in the sampled children. These oedema cases were observed mainly in Transmara District which accounted for 29 out of the 40 cases.

It was also observed on further analysis of this phenomenon that the oedema cases were caused by a range of factors ranging from food insecurity to high morbidity rates recorded for the children below the age of 5 years. Both the DHIS and the 2013 Narok County MCH baseline survey conducted concurrently with the SMART Nutrition also evidenced an increasing trend of the morbidity patterns in the children aged less than five years.

Other factors which included poor maternal and child health care, lack of family planning, teenage pregnancies, poor access to the health facilities and political marginalization, especially of Transmara East District, was observed. This was captured via the secondary data collected.

Figure 1: Distribution of Weight-for-Height Z Scores for the Sampled Children



The above figure compares the nutrition distribution curve of the sampled population with the WHO curve. The mean of the nutrition distribution of the sampled population was established as -0.23±1.07 which indicates a shift to the left of the sample curve when compared with the standard population curve implying a poorer nutrition status compared with the WHO reference population.

Table 5: 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)	
Age (months)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	335	6	1.8	11	3.3	295	88.1
18-29	282	0	0.0	8	2.8	262	92.9
30-41	230	2	0.9	8	3.5	218	94.8
42-53	185	1	0.5	6	3.2	175	94.6
54-59	77	0	0.0	3	3.9	74	96.1
Total	1109	9	0.8	36	3.2	1024	92.3

Further analysis showed that the severe wasting was more prevalent among the children aged 6 to 17 months (1.8%) while severe wasting was less prevalent among the children aged 18 to 29 months and 54 to 59 months (0.0%). Nevertheless, the moderate malnutrition was more prevalent among the children aged 54 to 59 months (3.9%) while it was less prevalent among the children aged 18 to 29 months (2.8%).

Table 6: Prevalence of Acute Malnutrition based on MUAC

	All n = 584	Boys n = 290	Girls n = 293
Prevalence of global malnutrition (< 125 mm and/or oedema)	**7.4%** [5.4-10.2, 95% C.I] N=83	7.4% (WHO) N=43	7.4% (WHO) N=40
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	**2.9%** [2.0–4.1, 95% C.I] N=32	2.6% (WHO) N=15	3.2% (WHO) N=17
Prevalence of severe malnutrition (< 115 mm and/or oedema)	**4.5%** [2.8-7.4, 95% C.I] N=51	4.7% (WHO) N=28	4.3% (WHO) N=23

The prevalence of global acute malnutrition based on the MUAC (<125 mm) was determined as 7.4% (n=83) (5.4 – 10.2, 95% CI) while the prevalence of severe acute malnutrition based on MUAC was found to be 4.5% (2.8 –7.4 95% CI). Additionally, according to the results, there was no significant difference between either the global acute malnutrition or severe acute malnutrition based on the MUAC across the gender since the results shows an overlap of the confidence interval.

3.2.2 Underweight

Underweight is a composite measure of both low weight-for-age and low height-for-age, indicating both acute and chronic malnutrition situation in an area. The underweight is determined by the weight-for-age z-scores where a child is classified as underweight if the WFA z-score is less than -2 and severe underweight if the z-score is less than -3 z-score.

Table 7: Prevalence of Underweight based on weight-for-age z-scores by sex

	All **n = 1069**	Boys **n = 547**	Girls **n = 522**
Prevalence of underweight (<-2 z-score)	(135) **12.6 %** (9.7 - 16.3 95% C.I.)	(82) 15.0 % (11.8 - 18.8 95% C.I.)	(53) 10.2 % (7.0 - 14.6 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(110) **10.3 %** (7.8 - 13.4 95% C.I.)	(66) 12.1 % (9.4 - 15.4 95% C.I.)	(44) 8.4 % (5.6 - 12.5 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(25) **2.3 %** (1.5 - 3.6 95% C.I.)	(16) 2.9 % (1.8 - 4.7 95% C.I.)	(9) 1.7 % (0.8 - 3.5 95% C.I.)

The results of the survey indicated that the prevalence of underweight in Narok County was 12.6% (n=135) (9.7 - 16.3 95% C.I.) and this was considered medium[7] based on the WHO standards. Additionally, the prevalence of the severe underweight was found to be 2.3% (n=25) (1.5 - 3.6 95% C.I.). The prevalence of underweight among the boys was slightly higher than for the girls showing a repeated trend as had been highlighted earlier due to the socio-cultural dynamics.

Table 8: 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 (mon)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	312	10	3.2	14	4.5	288	92.3	23	7.4
18-29	270	2	0.7	29	10.7	239	88.5	12	4.4
30-41	228	7	3.1	31	13.6	190	83.3	2	0.9
42-53	182	5	2.7	24	13.2	153	84.1	3	1.6
54-59	77	1	1.3	12	15.6	64	83.1	0	0.0
Total	1069	25	2.3	110	10.3	934	87.4	40	3.7

According to the results of the survey the prevalence of severe underweight was highest among the children aged 6 and 17 months (3.2%) while it was least among the children aged 18 and 29 months (0.7%). The prevalence of moderate underweight was highest among the children aged 54 and 59 months (15.6%) while it was least among the children aged 6 and 17 months which was 4.5%.

[7] WHO guidelines for underweight: <10% - low, 10%-19% - medium, 20%-29% - High, and >30% Alarming/Critical

3.2.3 Stunting

Stunting is an indicator of chronic malnutrition which is mainly attributed to long-term food deficiency and is generally an indicator of poor social economic situations linked to cultural food habits, lifestyles and poverty.

Table 8: Prevalence of Stunting based on Height-for-Age Z-scores and by Sex

	All **n = 1109**	Boys **n = 570**	Girls **n = 539**
Prevalence of stunting (<-2 z-score)	(309) 27.9 % (23.2 - 33.0 95% C.I.)	(181) 31.8 % (26.4 - 37.7 95% C.I.)	(128) 23.7 % (19.0 - 29.3 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(206) 18.6 % (15.5 - 22.1 95% C.I.)	(110) 19.3 % (15.8 - 23.4 95% C.I.)	(96) 17.8 % (14.4 - 21.8 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(103) 9.3 % (6.9 - 12.4 95% C.I.)	(71) 12.5 % (9.2 - 16.6 95% C.I.)	(32) 5.9 % (3.9 - 9.0 95% C.I.)

The prevalence of stunting was found to be 27.9% (n=309) (23.2 - 33.0 95% C.I.) which according to the WHO was classified as moderate. Additionally, the prevalence of severe stunting was found to be 9.3% (n=103) (6.9 - 12.4 95% C.I.). On the other hand, the results showed that though the prevalence of stunting among the boys was slightly more than for the girls which supported the trend highlighted earlier that boys were more affected by malnutrition as compared to girls due to socio-cultural factors.

Table 9: 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	335	26	7.8	48	14.3	261	77.9
18-29	282	25	8.9	58	20.6	199	70.6
30-41	230	30	13.0	47	20.4	153	66.5
42-53	185	16	8.6	39	21.1	130	70.3
54-59	77	6	7.8	14	18.2	57	74.0
Total	1109	103	9.3	206	18.6	800	72.1

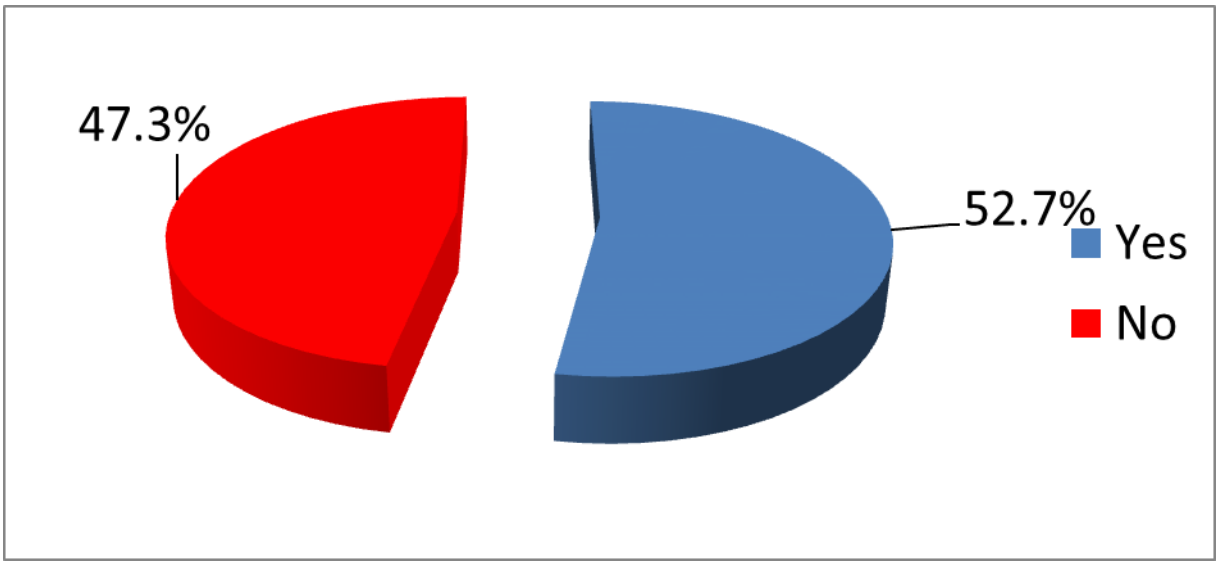
According to the results of the survey the prevalence of severe stunting was highest among the children aged 30 and 41 months (13.0%) while it was least among the children aged 6 and 17 months and 54 to 59 months which was 7.8% . The prevalence of moderate stunting was highest among the children aged 42 and 53 months (21.1%) while it was least among the children aged 6 and 17 months which was 14.3%.

3.4 Mother and Child Health.

This section presents information on the health status of the children under the age of 5 years and their caregivers. It presents information on the Vitamin A supplementation, deworming, measles vaccination and the maternal health status of the caregivers using MUAC in Narok County.

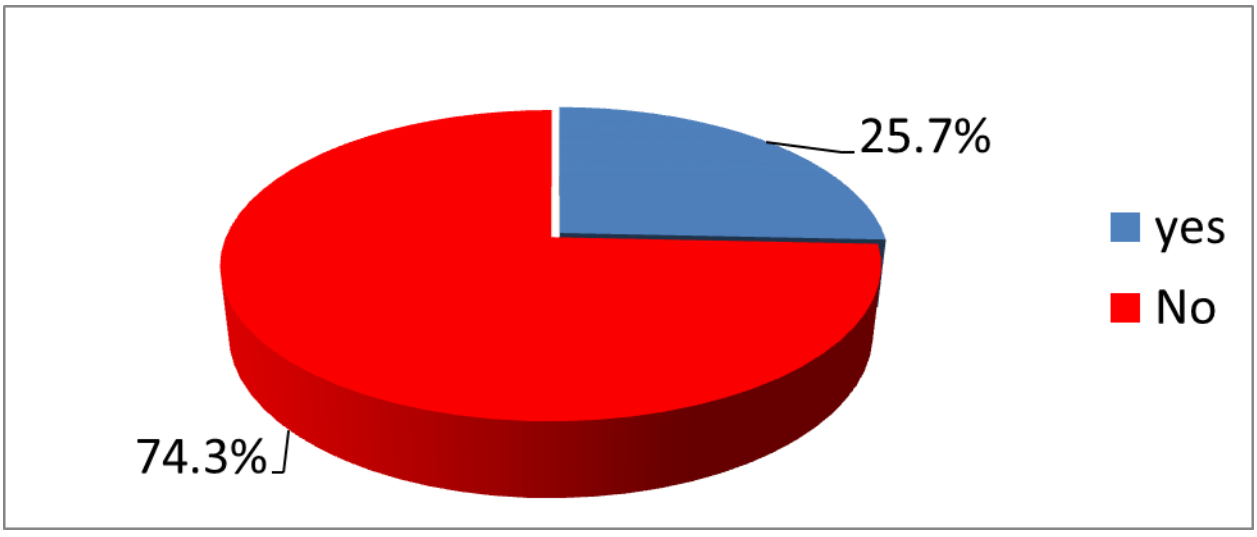
3.4.1. Vitamin A supplementation.

Figure 2: Vitamin A supplementation received (last 1 year). [6-59 months]



For the children aged 6-59 months in Narok County, only 52.7% (n= 622) had received Vitamin A supplementation within the last 1 year which is below the nationally recommended 80% coverage. Therefore, more efforts should be put to scale up Vitamin A supplementation activities in order to achieve the national targets of 80%.

Figure 3: Vitamin A supplementation (twice within the last 1 year). [12-59 months]

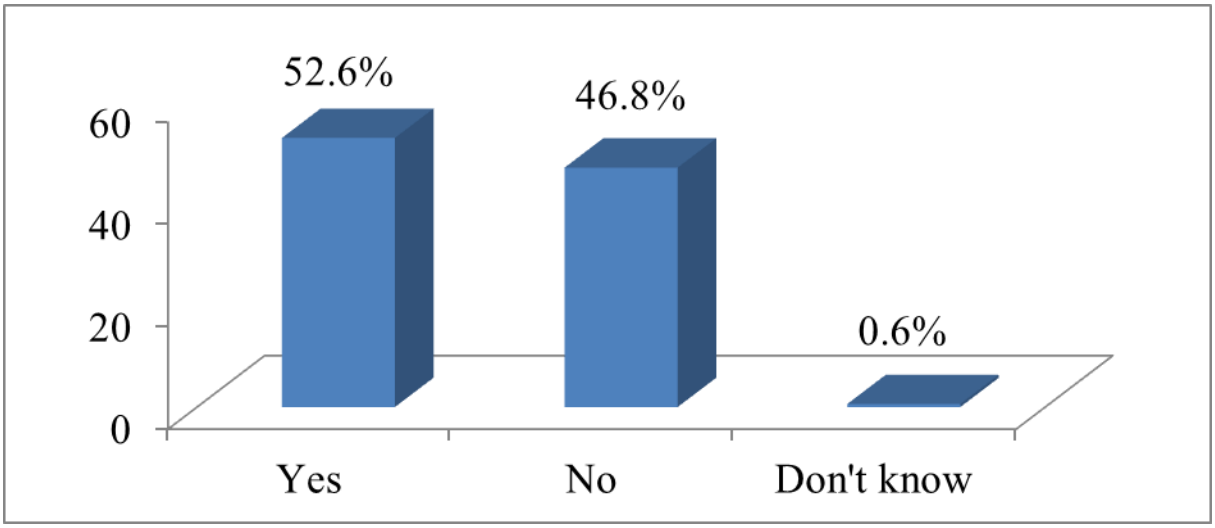


The above figure presents the proportion of children 1 to 5 years who had been supplemented twice within the past 12 months prior to the survey. 52.7% children had been supplemented with

Vitamin A within the last 1 year and only 25.7% (n= 622) had received the Vitamin A twice. This was inclusive of children age between 12-59 months. This also shows that the supplementation for Vitamin A was still low and thus required concerted efforts to improve the supplementation activities within Narok County.

3.4.2. Measles Vaccination

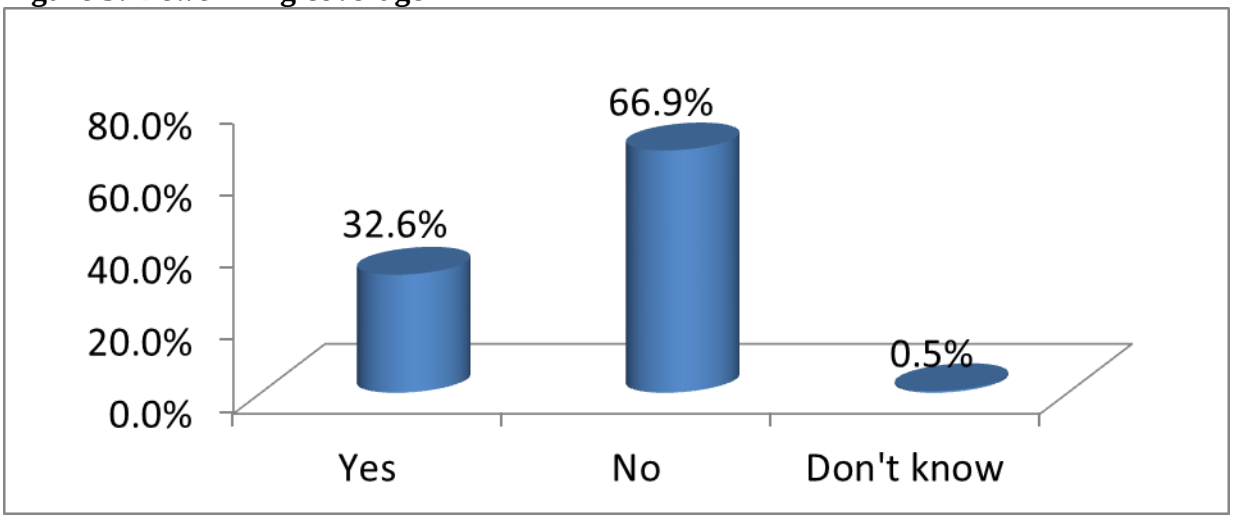
Figure 4: Measles vaccination coverage



From the graph above, only 52.6% (n=1034) of the children aged between 9 to 59 months in Narok County had received measles vaccination. This is below the recommended national targets of 80% and therefore calls for increased concentration of measles vaccination activities targeting the household, health facilities and County levels.

3.4.3. Deworming

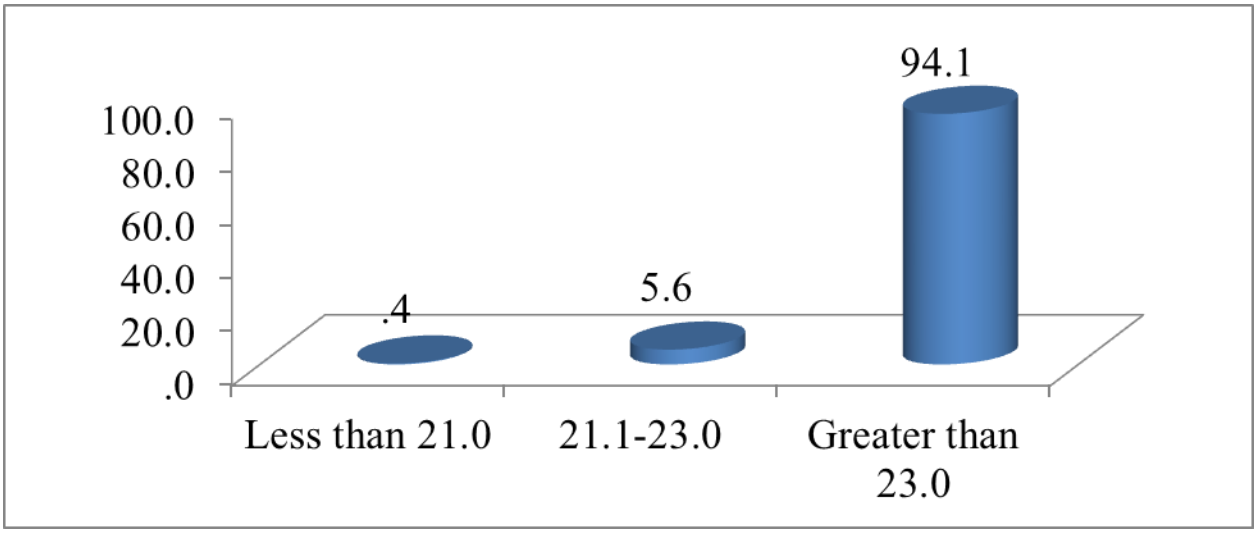
Figure 5: Deworming coverage



From the graph above, only 32.6% (N=1101) of the children aged between 12 to 59 months in Narok County had received deworming. This is far below the recommended national targets of 80% and therefore calls for increased concentration of deworming activities targeting the household, health facilities and County levels. This will reduce the morbidity cases load and ultimately improve both the nutritional and health status of the individual children in the County.

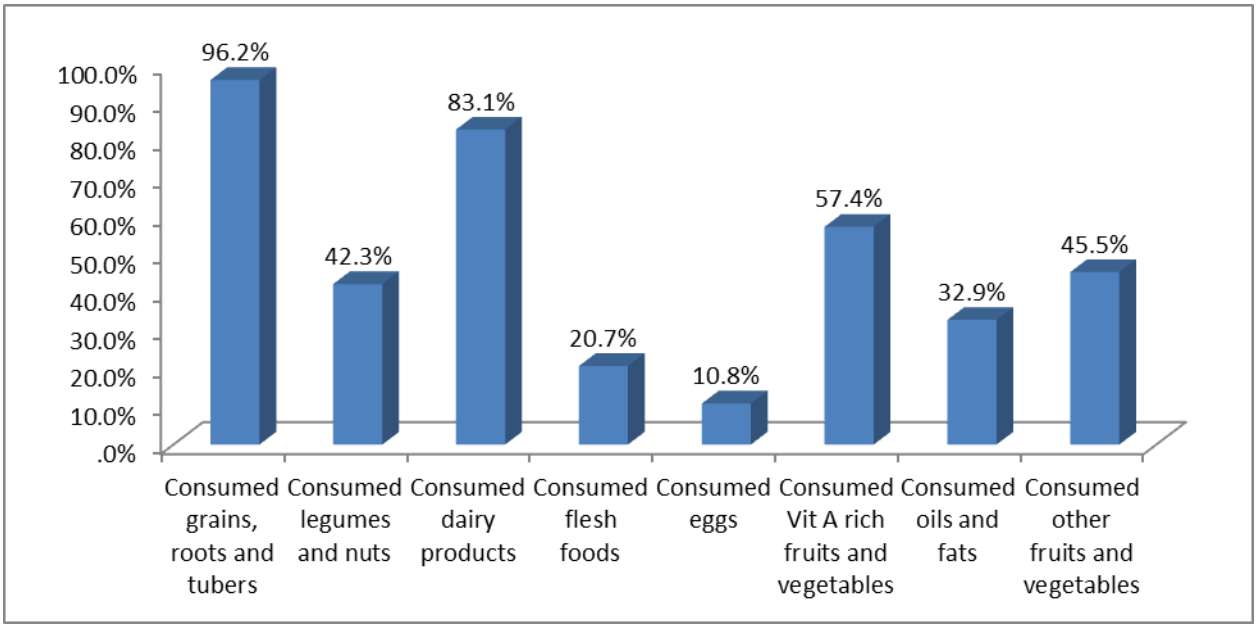
3.4.4. Maternal Health

Figure 6: Maternal Nutritional status by MUAC (%).



From the above graph, most of the caregivers of children aged 6-23 months assessed for malnutrition by MUAC, 94.1% (n= 444) were classified as having an normal nutritional status with a MUAC measurement of > 23.0 cm. Only a small percentage, 5.6% were moderately malnourished while 0.4% were severely malnourished. Therefore, it can be concluded that most of the caregivers had good nutritional status and were generally healthy.

Figure 7: Maternal dietary diversity.



From the above graph, most of the caregivers of children aged 6-23 months assessed for food consumption patterns and dietary diversity, it was observed that cereals comprised the major food group consumed (96.2%), followed by dairy products at 83.1%. This was because Narok County is classified as an agro-pastoral area and hence the population practices both agricultural farming, which is mainly cereals and keep livestock, especially cattle which provide the milk for consumption. Other food groups frequently consumed included Vitamin A rich and other fruits and vegetables and legumes at 57.4%, 45.5% and 42.3% respectively. This showed that the caregivers were able to access fruits and vegetables to complement their diets. The least consumed food groups by the caregivers were eggs (10.8%) and flesh foods (20.7%) which on further analysis revealed it was due to traditional and cultural barriers. This is because it was considered a taboo to eat eggs for the caregivers while for the flesh foods, were culturally acceptable for men to eat meat as compared to the women. This was predominantly in the Maasai culture.

3.5 Infant and Young Child Feeding/ Nutrition practices (IYCN).

The IYCN indicators which were included in the analysis include exclusive breastfeeding rate, timely initiation to breastfeeding, minimum meal frequency and the minimum dietary diversity. Much of these indicators were based on a 24 hours recall period in line with the WHO guidelines.

Table 10: IYCN Indicators.

AGE group	INDICATOR	n	N	%
0-5 months	Exclusive Breastfeeding	96	268	35.8%
	Timely Initiation to Breastfeeding	216	268	80.6%
6-23 months	Minimum Dietary Diversity - Boys (Breastfed)	146	197	74.1%
	Minimum Dietary Diversity - Boys (Non-Breastfed)	20	37	54.1%
	Minimum Dietary Diversity - Girls (Breastfed)	134	173	77.5%
	Minimum Dietary Diversity - Girls (Non-Breastfed)	16	37	43.2%
	Minimum Dietary Diversity - Breastfed	280	370	75.7%
	Minimum Dietary Diversity - Non-Breastfed	36	74	48.6%
	Minimum Dietary Diversity	316	444	71.2%
	Minimum Meal Frequency - Boys (Breastfed)	137	197	69.5%
	Minimum Meal Frequency - Boys (Non-Breastfed)	18	37	48.6%
	Minimum Meal Frequency - Girls (Breastfed)	120	173	69.4%
	Minimum Meal Frequency - Girls (Non-Breastfed)	13	37	35.1%
	Minimum Meal Frequency - Breastfed	257	370	69.5%
	Minimum Meal Frequency - Non-Breastfed	31	74	41.9%
	Minimum Meal Frequency	288	444	64.9%
	Continued Breastfeeding	370	444	83.3%

Breastfeeding is generally considered important for young children since it strengthens the immunity of the children among the many advantages. It is recommended that young children after birth should be introduced to breast milk within the first one hour.

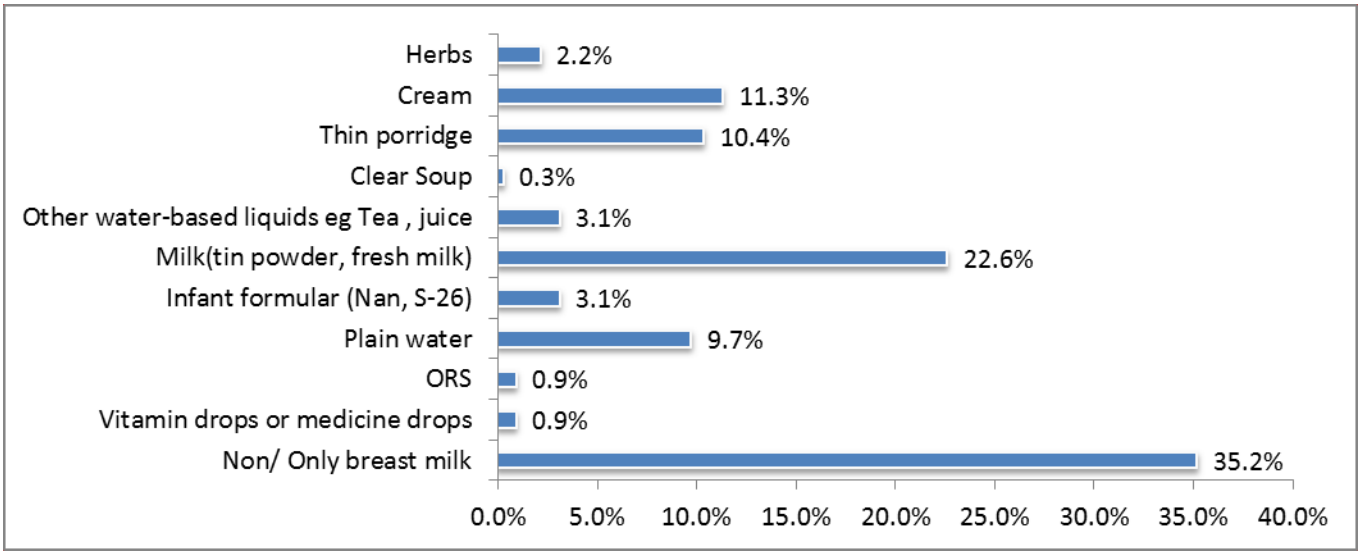
The above table presents the various IYCN indicators in Narok County. The proportion of children who were introduced to timely breastfeeding which was considered to be below 1 hour after birth was commendable as it was 80.6% (N=268). Further results shows that 83.3% (n=444) of the children in the sample practiced continued breastfeeding which is also considered high. These results show high and better indicators on the introduction of breastfeeding.

Further, recommendations by WHO is that children should consume only breast milk within the first months of birth without being fed on any other kind of food. However, the exclusive breastfeeding was considered low at only 35.8% (N=268) which was also below the 50% national targets.

Additionally, infants and young children ought to be given food from at least three food groups and also they should feed at least three times in a day. However, the results showed that the minimum dietary diversity was found to be 71.2% (N=444) which was considered good. Nevertheless, the minimum meal frequency among the sampled children was relatively good at 64.9% (n=444).

On further analysis between the breastfed and the non-breastfed infants in terms of the dietary diversity, there was significant difference since the minimum dietary diversity for the breastfed was 75.7% (n=280)as compared to the non-breastfed at 48.6% (N=36). This was also the case for the minimum meal frequency as for the breastfed had a score of 69.5% (N=257) as compared to the non-breastfed group who had a score of 41.9% (N=31).

Figure 5: Food groups consumed (0-5 months)



The main food groups consumed by the infants 0-5 months in Narok County included breast milk only (35.2%), milk sources (22.6%), cream (11.3%) and thin porridge (10.4%). The other food sources included: plain water (9.7%), infant formula and other water-based liquids both at (3.1%), and herbs (2.2%). Others included vitamin drops, ORS, and clear soup.

SECONDARY INFORMATION.

3.6 Food Security

The information was mainly provided by the Ministry of Agriculture, National Drought Management Authority and Arid Lands Office- Narok County. The following emerging issues were noted:

- There was a decreased maize harvest in 2012 due to disease infestation i.e. Maize Lethal Necrosis Disease which had majorly affected Transmara East District and had spread to Transmara West District. The disease had caused poor harvest and decreased the maize stocks and hence affecting the general food security of the population. ‘‘*There was 100% loss in maize harvest in Transmara East in 2012 due to the maize lethal necrosis disease, District Agriculture Officer- Transmara.’’*
- The short rains between October and December 2012 had generally decreases and this affected crop production. This was according to the literature review of the Short rain Assessment 2012 report by the National Drought Management Authority (NDMA).
- It was also observed that there was increased cultivation of sugarcane, which is a cash crop in Transmara district. This was rapidly replacing maize crop, which is the staple food crop, and reducing its acreage and production. According to an annual report done by the Transmara District Agricultural Office, sugarcane farming had increased from 4,000Ha in 2010 to13, 500 Ha in 2013.
  ‘‘*The National Cereals and Produce Board is almost closing down due to the adoption of sugarcane farming which is more profitable, Area resident during a Focus group discussion in Transmara.*
- The food prices had generally increased as compared with the previous year. This was according to the Short Rain Assessment report 2012 by the National Drought Management Authority (NDMA).
- According to a key informant interview with the Arid Lands Office – Narok County, there was a prediction of decreased food security over the coming months until December. This was also backed up by the Short Rain Assessment report 2012 by the National Drought Management Authority (NDMA)

3.7 Water and Sanitation

The information was generally provided by the County Water Officer KII, County Public Health Officer KII, District Water Officers KII, and literature review. The following emerging issues were noted:

- The latrine coverage was quite poor especially in the rural areas where open defecation was common as compared to the urban population. *“In urban settlements, the latrine coverage is >60% as compared with the rural areas which is <20%.” - County Public Health Officer Key Informant Interview*.
  - Accessibility to clean sources of water for drinking was also poor in rural areas with only <25% as compared with urban areas, >60%. The main sources of water in the rural areas included water pans, rivers, boreholes, unprotected shallow wells etc.

- The distance to clean water sources in the rural areas was found to be quite long hence hindering accessibility. *The average distance to a clean source of water in the rural areas is between 8-15 km as compared with the urban areas which is 1-3 km – County Water Officer KII.*
- On further probing of the water treatment practices, it was found out that this only happened in the urban areas but not in the rural areas. *Due to ignorance and illiteracy, rural people do not treat their drinking water and hence the high incidences of diseases in these areas- County Public Health Officer KII.*

3.8 Health, morbidity and Mortality trends

This information was provided by various key informant interviews that we conducted with the District Medical Officer of Health of the three districts, District Public Health Nurse- Transmara East, various NGO partners in the County providing health-related services e.g. World Vision (Narok North), Community Health Partners (Narok South), Walter Reed (Transmara) and the District Nutrition Officers of the 3 districts. The following emergency issues were noted.

- The population had very poor health seeking behavior, only seeking medical attention during medical emergencies. This was according to a key informant interview conducted with the various District Medical Officers of Health.
- According to 80-90% of the women who participated in the 4 focus group discussions in the 3 districts (2 in Transmara, 1 in Narok North and 1 in Narok South districts), they preferred traditional herbs to treat their diseases as opposed to seeking medical care.
- From the 4 focus group discussions we conducted, 92-99% of the women admitted to having delivered at home. This was because they felt more secure at home and because they could not afford to go to the health facilities which were located far and hence expensive.
- Teen pregnancies were also rampant with the average age of having the first child was 13-16 years and the average number of children was 8-10 children. This was according to the key informant interviews and FGDs conducted.
- The prevalent diseases noted were pneumonia, malaria, trachoma, typhoid, measles (outbreak was in February 2012) and diarrhea (341 dysentery cases in December 2012 alone). There was also noted a high HIV prevalence from the Walter Reed KII in Transmara.
- There were no cases of death directly related to malnutrition but due to other related diseases.
- It was also noted that few health facilities were available but not all were functional. This was due to understaffing and lack of resources. Few of the Government facilities had community units to be able to support the IMAM programme. This was highlighted from a key informant interviews by the District Nutrition Officer in Narok North.

3.6 Malnutrition trends

This information was provided by literature review of existing reports, key informant interviews with the District Nutrition Officers, DMOH and various partners within the County. The following emerging issues were highlighted.

- There has been an increased case of malnutrition in the 3 districts in Narok County since 2012. This was according to County Nutritionist and District Nutrition Officers key informant interviews.
- There has been increased oedema cases referred to the district hospitals i.e. >2 per month as per the 3 district hospital records. This was according to the hospital records in the three main hospitals i.e. Narok South, Transmara and Narok North district hospitals.
- There was an increase in the malnutrition cases in the Comprehensive Care Clinics according to Walter Reed programme officer KII and hospital records in Transmara district.
- The District Health Information System (DHIS) also backed these sentiments:

	2011	2012	2013 (Jan-May)
Marasmus	**46**	**59**	**48**
Kwashiorkor	**28**	**42**	**20**
Faltering weight	**702**	**645**	**130**

Source: Transmara DHIS

4.0 Conclusions

Being the first SMART nutrition survey in Narok County, the survey has highlighted the current general nutrition status of the population. The information generated from this will go a long way to addressing issues of malnutrition within the County As demonstrated in the findings, the overall prevalence of global acute malnutrition (GAM) based on the Weight-For-Height Z Scores and/or oedema was 7.7% (n=85) (5.3-11.0, 95% C.I) 85 which is medium as per the WHO standards. On the other hand, the prevalence of the severe acute malnutrition (SAM) among the children aged 6-59 is equally at 4.4% again classified as emergency level. The critical nutrition status in Narok County was attributed to the many oedema cases that were observed (n=40) which was mainly in Transmara District which accounted for 29 of the 40 observed and verified cases.

The survey further concludes that, given that the nutrition distribution of the sampled population was established as -0.23±1.07, when compared with the standard population curve by WHO. It implies that there is poor nutrition status in Narok County compared with the WHO reference population.

This is further confirmed by the fact that there were 40 cases (3.6%) of confirmed oedema in the County. It was also observed, on further analysis of this phenomenon that the oedema cases were caused by a range of factors ranging from food insecurity to high morbidity rates recorded for the children below the age of 5 years. Both the DHIS and the 2013 Narok County MCH baseline survey conducted concurrently with the SMART Nutrition also evidenced an increasing trend of the morbidity patterns in the children aged less than five years. Other factors which included poor maternal and child health care, lack of family planning, teenage pregnancies, poor access to the health facilities and political marginalization, especially of Transmara East District, was observed. This was captured via the secondary data collected.

Underweight in Narok County on the other hand was at 12.6% (n=135) (10.2 – 20.8 95% CI) and this is considered medium by WHO standards. Stunting as an indicator of chronic malnutrition which is mainly attributed to long-term food deficiency was at 27.9% (n=309) (23.3 – 33.2, 95% CI) which is classified as medium and therefore the survey concludes that the population is generally well nourished and generally food secure which is attributable to the agro-pastoral classification of Narok County which generally receives good amounts of rainfall to sustain the agricultural farming and livestock keeping within the county.

With regard to children's health status, the survey observes the coverage of Vitamin A in Narok County 52.7% which is still below the nationally recommended 80% coverage target. Likewise, measles coverage at 52.6% which is also below the national recommended 80% target. The below target coverage has a bearing in the poor nutritional health status of the children.

From the secondary information collected, it was concluded that there were many underlying issues causing the malnutrition. These included political marginalization of Transmara East District hence depriving them of resources, high rates of disease prevalence in the County, poor water, hygiene and sanitation practices especially in rural areas, inaccessibility to health facilities which were understaffed with few resources, very poor health seeking behavior due to outdated cultural practices and beliefs, no family planning practices which contributed to the high number of children per household and without birth spacing, teenage pregnancies were also rampant which contributed to the vicious cycle of malnutrition.

5.0 Recommendations and priorities

On the basis of the survey findings and general observations, the survey recommends the following immediate action in the short term:

- Enhanced and targeted feeding programme especially to the most vulnerable segments of the community. This is based on the nature of severe malnutrition in the county at 4.4%. Commensurate SFP that combines with the others OTPs is also strongly advised especially in Transmara District which had 29 of the 40 confirmed oedema cases. This will be aimed to lowering the high prevalence of severe acute malnutrition which according to the WHO standard are considered to be critically high in a given population.
- There should be concerted efforts aimed at improving the accessibility of clean water sources and community sensitization on hand washing and hygienic practices. This can be implemented through community health education and increased outreach activities to these areas.
- The EBF rate was at 35.8% and was aggravated by the poor infant and young child nutrition and feeding practices. In light of this, capacity building of the health personnel is important on IYCN, BFHI and nutrition. Also, the mother-to-mother support groups can be formed to strengthen good IYCN practices and promote exclusive breastfeeding.
- It was also observed (especially from the focus group discussions) that most of the mothers (>80%) delivered at home. Therefore, increased sensitization is required on deliveries at the health centers.
- There was also low family planning practice (average number of children was 7-11) and therefore there is need to sensitize the community on birth spacing and family planning.
- Strengthen reporting of nutrition indicators in the respective District Health Information Systems (DHIS).
- Urgent response is required for the treatment of the Maize lethal necrosis disease which is causing poor harvests of the maize crop which is the maize staple food crop in the County.
- Community sensitization on drought tolerant crops due to the climate change which are more nutritious instead of concentrating on only one staple food crop. E.g. sorghum, pigeon peas etc.
- There is urgent need to build more latrines in the communities. This should also be linked to community sensitization on behavior change to adoption of latrine usage to prevent disease and therefore improve their health status. Community Led Total Sanitation (CLTS) approach can help in this aspect.
- There is also need to tackle communicable diseases that are prevalent in the area. This should be through intensified health outreach activities to these areas combined with health education.
- Vitamin A supplementation activities need to be scaled up in order to achieve the 80% national target. This may be enhanced through community health outreach activities to the areas not accessible to health facilities.
- There is need to strengthen the IMAM programme within these regions through enhanced capacity building of the health workers to implement the management of these cases at the community level. The referral systems should also be strengthened in order to address the cases of malnutrition.
- Community sensitization on treating drinking water should also be scaled up through health campaigns and education.

Medium and long term intervention will include the following:

- In the medium and long term, efforts should be directed at improving and enhancing the communities' health seeking behavior. This may be achieved through focusing on behavior change strategies and closely working with the communities to encourage adoption of seeking medical attention in the health facilities.
- There is also need for strategic and multi-faceted approach in addressing the severe malnutrition in the county with different actors mobilized to provide interventions at different levels in a holistic manner. This involves concerted efforts from all the stakeholders in the health sector including the Government to come up with an action plan aimed at improving the overall health and nutritional status of the people.
- There is need to enhance community education on adoption of proper methods of treating water particularly boiling and chlorination. This calls for closely working with the community using participatory methods in order to achieve behavior change given the socio-cultural factors at the community level.

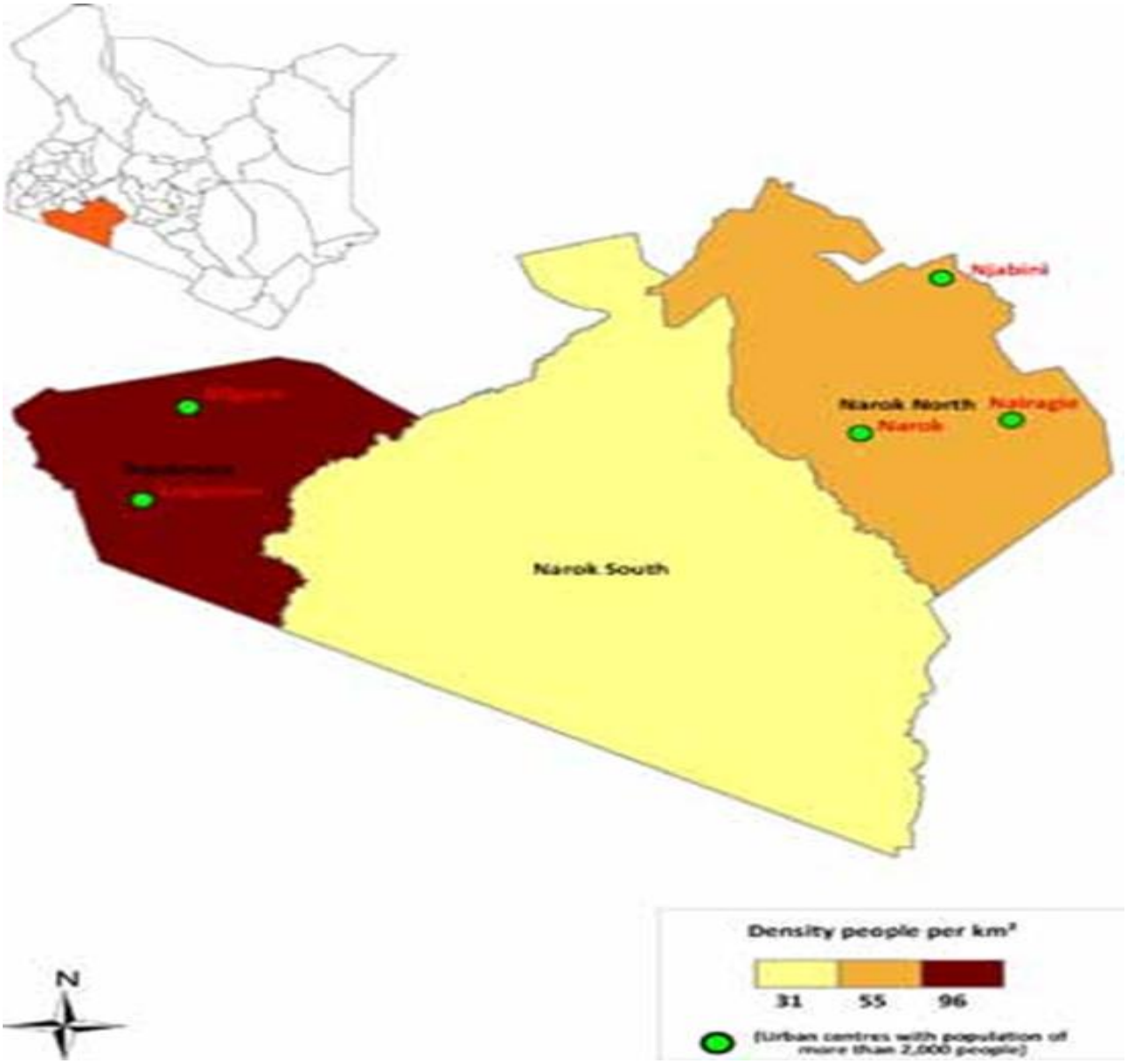
6.0 Appendices

6.1 Appendix 1: Assignment of clusters

District	**Location**	**Cluster Number**	**Name of Cluster/Village**
TRANS MARA	KAPSASIAN	**1**	Kiptebes
TRANS MARA	SHANKOE	**3**	Shankeo
TRANS MARA	ESOIT-NAIBOR	**9**	Enairukurukoi
TRANS MARA	NKARARO	**10**	Idolisho
TRANS MARA	OLONTARE	**12**	Oldoteek
TRANS MARA	KAPSASIAN	**RC**	Tumta dip **R.C (98)**
TRANS MARA	SOKON	**14**	Cheputiat
TRANS MARA	MACHANGWA	**18**	Kemusendi
TRANS MARA	MASURURA	**19**	Inkotikoishi
TRANS MARA	MUGOR	**RC**	Araret **R.C (97)**
TRANS MARA	NDONYO	**22**	Naarlong
TRANS MARA	OSUPUKO	**24,25,26**	Merigito
TRANS MARA	NJIPISHIP	**27**	Muyian
TRANS MARA	NTULELE	**31**	Endonyo-osokon
TRANS MARA	OSINONI	**32**	Ngasii
TRANS MARA	SIKAWA	**33**	Ilngushin
TRANS MARA	OLOIREN	**38**	Olmenera
TRANS MARA	OLOMISMIS	**39**	Osupuko Central
TRANS MARA	OSUPUKO	**43**	Emorongi
TRANS MARA	SHANKOE	**45**	Oldonyo-orasha AND Naronyo AND Nkenjet-oolasho
TRANS MARA	SIKAWA	**46**	Kishuat
NAROK SOUTH	AITONG	**RC**	Oloosokon **R.C-(96)**
NAROK SOUTH	ELANGATA ENTERIT	**2**	Enkutoto
NAROK SOUTH	ENELERAI	**4**	Ngutoto **(INACCESSIBLE)**
NAROK SOUTH	ENTASEKERA	**7**	Nairotia
NAROK SOUTH	NAROOSURA	**8**	Etayot
NAROK SOUTH	OLMESUTIE	**13**	**INACCESSIBLE**
NAROK SOUTH	LEMEK	**17**	Oserro
NAROK SOUTH	NAIKARA	**RC**	Olkoroi **R.C (95)**
NAROK SOUTH	SAGAMIAN	**20**	Tengecha
NAROK SOUTH	MORIJO LOITA	**21**	Olkijiji
NAROK SOUTH	SOGOO	**28**	Kijaba
NAROK SOUTH	NTUKA	**29**	Nkimpa **(INACCESSIBLE)**
NAROK SOUTH	NTUKA	**30**	Isugurro
NAROK SOUTH	ENELERAI	**RC**	Kaptararogon **-R.C (99)**
NAROK SOUTH	SAGAMIAN	**48**	Ndasasian
NAROK NORTH	ENABELIBEL	**5**	Olorupa
NAROK NORTH	OLETUKAT	**6**	Eor-Isimu

NAROK NORTH	OLOLONGOI	**11**	Oleopolos
NAROK NORTH	MOSIRO	**15**	Kisise
NAROK NORTH	ENABELIBEL	**16**	Sinkiter
NAROK NORTH	NAITUYUPAKI	**23**	Enyorau
NAROK NORTH	NKARETA	**34**	Ololtotu
NAROK NORTH	SUSWA	**35**	Enginorut
NAROK NORTH	OLPOSIMORU	**36**	Olmeriko
NAROK NORTH	OLOKURTO	**37**	Olotirik
NAROK NORTH	OLORROPIL	**40**	Intamejo
NAROK NORTH	OLPOSIMORU	**41,42**	Nasiida AND Masikonte **(INACCESSIBLE)**
NAROK NORTH	UPPER MELILI	**44**	Sakutiek
NAROK NORTH	SIAYAPEI	**47**	Rokonka

6.2 Appendix 2: Map of the area



6.3 Appendix 3: Questionnaires.

ANTHROPOMETRIC & HEALTH QUESTIONNAIRE.

AREA IDENTIFICATION	
County ……	
Region ……	
District	
Division	
Location ……	
Sub location ……	
Village/Cluster ……	
Cluster No......	☐☐
Household No.	☐☐
Team Number	☐
Name of Team Leader	_____
Name of Interviewer	_____
Date of Interview	**Date Month Year** ☐☐ ☐☐ ☐☐☐☐

Q/N	Variable	Child # 1	Child # 2	Child #3
C1	Sex of child	Male ..... 1 Female..... 2	Male..... 1 Female 2	Male ..... 1 Female..... 2
C2	Date of Birth (Date/month/year)	Date..... ☐☐ Month..... ☐☐ Year..... ☐☐☐☐	Date ..... ☐☐ Month ..... ☐☐ Year ..... ☐☐☐☐	Date..... ☐☐ Month..... ☐☐ Year..... ☐☐☐☐
C2	Age in months			
C2	Age verification	1. Health card. 2. Birth certificate 3. Baptism card 4. Recall	1. Health card. 2. Birth certificate 3. Baptism card 4. Recall	1. Health card. 2. Birth certificate 3. Baptism card 4. Recall
C3	Weight (Kg)- (nearest 0.1)	Weight ☐☐ . ☐	Weight ☐☐ . ☐	Weight ☐☐ . ☐
C4	Height (cm)- (nearest 0.1)	Height ☐☐☐. ☐	Height ☐☐☐. ☐	Height ☐☐☐. ☐
C5	Pitting Oedema both feet: *(please Circle the correct answer)*	Yes ..... 1 No 0	Yes..... 1 No 0	Yes ..... 1 No 0
C6	MUAC (to the nearest 0.1 cm)	_____._____	_____._____	_____._____
C9	Measles vaccination (**(Last 1 year**)	Yes by card ..... 1 Yes by recall ..... 2 No……3 Don't know……..4	Yes by card..... 1 Yes by recall..... 2 No…….3 Don't know……...4	Yes by card ..... 1 Yes by recall ..... 2 No……3 Don't know…….4
C1	Has the child received Vitamin A cap**. (Last 1 year**)? *show capsule*	Yes ..... 1 No 2	Yes..... 1 No 2	Yes ..... 1 No 2
C11	How Many Times has the child received Vitamin A in the **last one year**			
C12	Has the child taken any drug for intestinal worms within **the last 6 months?** *Show samples if available*	Yes (by card)..... 1 Yes (by recall)..... 2 No ..... 3 Don't Know 4	Yes (by card) ..... 1 Yes (by recall) ..... 2 No ..... 3 Don't Know..... 4	Yes (by card)..... 1 Yes (by recall)..... 2 No ..... 3 Don't Know 4

MATERNAL NUTRITIONAL STATUS FOR MOTHERS WHOSE CHILDREN HAVE BEEN MEASURED		
AN3	MUAC (cm), left arm	_____.___ or > **26.0 cm**

COMPLEMENTARY FEEDING (6-23 months)		
CF1	When did you start breastfeeding this child after the delivery?	0…….Never 1……..……Less than 1 hour 2….More than 1 but less than 24hrs. 3……..More than one day
CF2	From this time yesterday until now, was the child given breast milk?	1……Yes 0……No
CF3	From this time yesterday until now, did the child receive solid, semi-solid or soft foods?	1……Yes 0……No
CF4	From this time yesterday until now, how many meals or snacks was the child fed?	

CF5. From this time yesterday until now, what did the child and the mother eat?

Do not leave any blank

0 = did not consume, 1 = Consumed

	Food Group	**Examples**	**6-23 months**	**Mother**
FG1	**Grains, Roots and Tubers**	Sorghum, maize, spaghetti, bread, white tubers, white potatoes, white yams, cassava or foods from roots, white sweet potatoes		
FG2	**Legumes and Nuts**	Beans, lentils, green grams, cowpeas, dried peas		
FG3	**Dairy Products**	milk, yogurt, cheese (cow, goat, camel, fermented milk, powdered milk)		
FG4	**Flesh Foods (meat, fish, poultry and liver/organ meats)**	meat, poultry, kidney, heart or other organ meats or blood based foods, spleen, fresh or dried fish or shell fish smoked, salted or fried		
FG5	**Eggs**			
FG6	**Vitamin A Rich Fruits and Vegetables**	pumpkin, carrots, yellow-orange flesh sweet potatoes, ripe mango, papaya, dark green leafy vegetables (cassava leaves, pumpkin leaves, cowpeas leaves, sukuma wiki, spinach)		
FG7	**Other Fruits and Vegetables**	Banana, watermelon, cucumber-like vegetables		
FG8	**Fats and oils**			

INFANT AND YOUNG CHILD FEEDING QUESTIONNAIRE
CHILD 0-5 MONTHS FORM

***This page must be filled in for every household with a child aged 0-5 months; every child in this range should be included.**

COUNTY:_____	**CLUSTER NO. [ ][ ]**	**NAME OF TEAM LEADER:_____**
DISTRICT:_____	**TEAM NO. [ ][ ]**	**TEAM LEADER'S PHONE NO.:_____**

DATE OF INTERVIEW [D][D]/[M][M]/ [Y][Y]

EB 1	EB 2	EB3	EB 4	EB5	EB6	EB 7	EB 8	EB 9	EB 10
HH No	Child No.	Age of the child Months or DOB	Sex 1 = Male 2 = Female	When did you start breastfeeding this child after the delivery? 0 = Never 1 = Less than1 hr 2 = More than 1 but Less than24hrs 3 = More than one day days	From this time yesterday until now was the child given breast milk? 0 = No 1 = Yes	In the first 3 days after delivery, was the child given anything to drink other than breast milk? 0 = no (breast milk only) 1 = plain water 2 = sugar water or glucose water 3= powder or fresh animal milk 4 = Formula (Nan,S-26) 66 = other (specify)	What liquids was this child given from this time yesterday until now 0 = None/ Only breast milk 1 = vitamin drops or medicine drops 2 = ORS 3 = plain water 4 = infant formula (Nan, S-26) 5 = Milk (tin, powder, fresh milk) 6 =Other water-based liquids e.g. Tea, juice 7 = Clear soup 8=Sour milk(maziwa lala) or yoghurt 9 = Thin porridge 66=Other(specify)	If the child consumed infant formula, milk (fresh, powder, tin) or sour milk/yoghurt, how many feeds was she/he given from this time yesterday until now? 0 = None/ not applicable 1 = 1 feed 2= 2 or more feeds	What foods were given to the child from this time yesterday until now? --------- 0 = None/ Only breast milk 1 = Cereals, roots and tubers 2 = Legumes/ nuts 3 = Meat / poultry / offal/ fish 4 = Milk & milk products 5= Vitamin A-rich fruits & vegetables 6= Other Fruits and vegetables 7= Eggs 8 = Oil / fats 9 = Sweets & honey
	1								
	2								
	3								
	4								
	5								
	6								
	7								
	8								
	9								
	10								

Grains, roots, and tubers: rice, cassava, potatoes, yams	**Legumes and nuts:** Groundnuts, cow peas, beans	**Dairy products:** Cow milk, yogurt, cheese, tin milk	**Flesh foods:** Chicken, bush meat, cow meat, pig, fish	**Eggs:** Chicken egg, guinea fowl egg	**Vitamin A-rich foods:** Carrot, dark green leafy vegetables (cassava, sweet potato leaves, red amaranth), pumpkin, mango, red palm oil	**Other fruits and vegetables:** Orange, lemon, citrus fruits, pineapple, banana, plantain

Note: foods above are given for reference purposes only; they need to be reviewed and replaced by local foods

6.4 Appendix 4: Plausibility test.

INDICATOR	Acceptable values	Survey values	Comments
Digit preference- weight	< 10	2	Excellent
Digit preference- height	< 10	4	Excellent
WHZ (Standard deviation)	< 1.2	1.01	Excellent
WHZ (Skewness)	< +/- 3	0.03	Excellent
WHZ (Kurtosis)	< +/- 3	- 0.17	Excellent
WHZ(Poisson distribution)	> 0.001	0.000	Problematic
Percent of flags (WHZ) **WHO**	< 1.2	1.07	Good
Percent of flags (HFA) **WHO**	< 2	1.37	Acceptable
Group 1 ratio (6-17 months)		1.3	Good
Group 2 ratio (18-29 months)		1.2	Good
Group 3 ratio (30-41 months)		0.9	Good
Group 4 ratio (42-53 months)		0.8	Acceptable
Group 5 ratio (54-59 months)		0.7	Acceptable
Age total ratio	Around 1.0	1.26	Acceptable
Sex ratio	0.8 – 1.2	1.06	Good
General Acceptability	< 15	**15**	**Acceptable**

6.5 Appendix 4: Calendar of events

MONTH	Seasons	2008	2009	2010	2011	2012	2013
January	New year/ploughing		53	41	29	17	5
FEBRUARY	planting		52	40	28 lack of maize seed	16	4
MARCH			51	39	27	15	3 General elections
APRIL			50	38	26 Loliondo starts/ maize disease	14 Eunoto/ kuvuka daraja	2
MAY	schools open		49	37	25	13	1
JUNE	spray of crops		48	36 Kones/ Laboso death	24	12 Saitoti death	0 Maternity free
JULY	wildbeest migration	59	47	35	23	11	
AUGUST	schools close/harvesting	58	46 national census	34 constitutional referendum	22 Loliondo ends	10 Rudisha returns/ Eunoto ends	
SEPTEMBER	schools open	57	45	33	21 Losim FM launched	9	
OCTOBER	national exams prayers	56	44	32	20	8	
NOVEMBER	schools close	55	43	31	19 Narok- Equity war	7 Voter registration	
DECEMBER	christmas/ initiation	54	42	30	18	6	

6.6 Appendix 5: Survey Team

Teams	Name	Responsibility
Consultants	Mr. Martin N. Njoroge	Analytical Report Writing & Field Technical Inputs.
	Mr. Joseph Njuguna	Data Analysis & Report Writing
MCH Project Coordinator	Mr. Samuel Nyutu	Co-ordination
MCH M&E Officer	Mr. Steven Ngugi	Co-ordination
D.N.O - Narok North	Mrs. Zahara	Supervisor
D.N.O - Transmara	Mrs. Angela	Supervisor
Hospital Nutritionist- Narok District Hospital	Mrs. Nancy	Supervisor
CHP partner	Ms. Patricia	Ass. Supervisor
NRDP partner	Mr.Wirry	Ass. Supervisor
TRDP partner	Mr. Rodney	Ass. Supervisor
Enumerators		
Team 1	Mr. Muna Manuel	Team leader
	Collins Okinyi	Enumerator
	Benson Tiapukel	Enumerator
Team 2	Ms. Monicah Kooke	Team leader
	Jackson Suuji	Enumerator
	David Koonyi	Enumerator
Team 3	Mr. Simon Kerembe	Team leader
	Jackeline Timpiyan	Enumerator
	Timothy Mpaayei	Enumerator
Team 4	Mr. Thomas Langat	Team leader
	Jonathan Sankei	Enumerator
	Elvis Lemurt	Enumerator
Team 5	Mr. Gideon Ng'ang'a	Team Leader
	Linda Narasha	Enumerator
	Esther Mwanza	Enumerator
Team 6	Ms. Sarah Ekirapi	Team leader
	Augustine Kitur	Enumerator
	Dickson Santeto	Enumerator

6.7 Appendix 6: References

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