



Report of Small-Scale SMART Survey in MMC, Jere LGAs,
Borno

Borno State, Nigeria

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ABBREVIATIONS

AAH.....	Action Against Hunger
CDC.....	Centers for Disease Control
CI.....	Confidence Interval
CMAM.....	Community Management of Acute Malnutrition
CMR.....	Crude Mortality Rate
EA.....	Enumeration Areas
ENA.....	Emergency Nutrition Assessment
FAO.....	Food & Agriculture Organization
GAM.....	Global Acute Malnutrition
HAZ.....	Height for Age
IDPs.....	Internally Displaced Persons
IYCF.....	Infant & Young Child Feeding
IMCI.....	Integrated Management of Childhood Illnesses
LGA.....	Local Government Area
MAM.....	Moderate Acute Malnutrition
MMC.....	Maiduguri Municipal Council
MoH.....	Ministry of Health
MUAC.....	Mid Upper Arm Circumference
NBS.....	National Bureau of Statistics
NDHS.....	National Demographic Health Survey
NFP.....	Nutrition Focal Person
NNHS.....	National Nutrition & Health Survey
OCHA.....	United Nations Office for the Coordination of Humanitarian Affairs
OTP.....	Outpatient Therapeutic Programme
PHC.....	Primary Health Care
PLW.....	Pregnant & Lactating Women
U5MR.....	Under 5 Mortality Rate
RUTF.....	Ready to Use Therapeutic Food
SAM.....	Severe Acute Malnutrition
SC.....	Stabilization Center
SFP.....	Supplementary Feeding Programme
SMART.....	Standardized Monitoring for Assessment in Relief & Transitions
SPHCDA.....	State Primary Healthcare Development Agency
UNICEF.....	United Nations Children's Education Fund
WAZ.....	Weight for Age Z scores
WHO.....	World Health Organization
WHZ.....	Weight for Height Z scores
WFP.....	World Food Programme

EXECUTIVE SUMMARY

Introduction

Nigeria is bordered by Niger and Chad to the north, Cameroon to the east, and Benin to the west, with approximately 850 kilometers of coastline on the Gulf of Guinea to the south. It is divided into 36 States, plus the Federal Capital Territory (FCT) of Abuja and further subdivided into 774 Local Government Areas (LGAs). The States are grouped into six distinct geopolitical zones— North Central, North East, North West, South East, South, and South West. The total land area is 923,000 square kilometers.

In Nigeria, about 14 million people - 8.5% of the total population - are undernourished according to FAO/WFP/IFAD (2012). It is also home to the highest number of stunted children in the continent and ranks second globally with more than 10 million stunted children. The 2013 Nigeria Demographic and Health Survey (NDHS) reported 37% of children 6 under five as being stunted, 29% as underweight, and 18% as wasted. In addition to a lack of basic protein and energy, the immediate causes of under nutrition are a lack of micronutrients such as vitamin A, iodine, iron, and zinc. Almost 63% of women are anemic and 31% are iodine deficient, while close to 30% of 7 under-fives are vitamin A deficient (VAD) and 20% are zinc deficient

14.8 million people are affected by the crisis in the north-east of Nigeria precipitated by Boko Haram-related violence since 2009. The armed conflict has affected civilians already living in precarious conditions and undermined poverty reduction and development efforts, putting at risk inter-ethnic and inter-religious co-existence, strained State Government resources and depleted community coping capacities over the past six years. While some internally displaced people (IDPs) live outside the four states of focus, these states, Adamawa, Borno, Gombe and Yobe, have been disproportionately affected by the crisis and are prioritized and referred to collectively here as north-east. From the affected population, an estimated 7 million people, comprising displaced, confined and hosting civilians, are currently in need of humanitarian assistance.

As a priority in Nigeria's National Strategic Plan of action for Nutrition (2014 - 2019), nutrition information systems has been incorporated to ensure proper monitoring and evaluation controls are in place for early detection of nutrition emergencies, growth monitoring of the population, and evaluation of nutrition programming.

Rationale of the Survey

- a) The main purpose of the small-scale nutrition survey was to determine the nutrition situation among the host communities in MMC and Jere LGAs.
- b) Secondly, due to the lack of representative nutrition data at the Local Government Area (LGA) for both MMC and Jere LGAs the assessment was planned address the gaps for nutrition and mortality data and surveillance of the host communities.

Goals and Objectives

The overall goal of the proposed small-scale SMART nutrition survey was to assess the nutritional status of children less than 5 years of age. This involved providing anthropometric data along with mortality rates of the survey population using the SMART methodology.

Methodology

The Small Scale Survey (SSS) adopted a cross-sectional design with two-stage cluster sampling based on the SMART methodology with the clusters being selected using the probability proportional to population size (PPS). The typical sample size of a Small Scale SMART survey is 25 clusters by 10 households, but when retrospective mortality is added to the survey, the sample size must be increased, and a 30 clusters by 14 households is advised by CDC and the Global SMART guidelines.

Anthropometric data, two-week retrospective morbidity and retrospective mortality data was collected. 30 clusters based on probability to proportional to size were selected using the ENA for SMART software Nov, 2013 version (9th July 2015 update).

Results

Findings of the nutrition survey indicate an emergency nutrition situation among the surveyed population as per WHO standards. The prevalence of Global Acute Malnutrition (GAM) in MMC and Jere LGAs based on weight for height z scores /and or oedema was 19.2% (14.7 - 24.6, 95% C.I.) and the prevalence of Severe Acute Malnutrition (SAM) was 3.1% [1.6 - 6.0, 95% C.I.]. The poor nutrition situation is attributed majorly to poor food security due to the influx of the IDPs in the host communities and the high incidence of disease among children aged 6-59 months. Results for Anthropometry, Mortality and Morbidity indicators are summarized below.

Table 1: Summary of Survey findings

Children 6-59 months Anthropometric results(WHO 2006 Standards)		
INDEX	INDICATOR	APRIL 2016
WHZ-scores	Prevalence of global malnutrition (<-2 z-score and/or oedema)	(74) 19.2 % (14.7 - 24.6 95% C.I.)
	Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(62) 16.1 % (12.8 - 19.9 95% C.I.)
	Prevalence of severe malnutrition (<-3 z-score and/or no oedema)	(12) 3.1 % (1.6 - 6.0 95% C.I.)
HAZ- scores	Prevalence of stunting (<-2 z-score)	(119) 30.7 % (25.8 - 36.2 95% C.I.)
	Prevalence of moderate stunting (<- z-scores and >=-3 z-score)	(75) 19.4 % (14.8 - 24.9 95% C.I.)
	Prevalence of severe stunting (<-3 z-score)	(44) 11.4 % (8.7 - 14.8 95% C.I.)
WAZ-scores	Prevalence of underweight (<-2 z-score)	(110) 28.1 % (22.8 - 34.1 95% C.I.)
	Prevalence of moderate underweight (<- z-scores and >=-3 z-score)	(76) 19.4 % (15.7 - 23.8 95% C.I.)

	Prevalence of severe underweight (<-3 z-score)	(34) 8.7 % (6.4 - 11.7 95% C.I.)
MUAC	Prevalence of global malnutrition by MUAC	(23) 5.9 % (3.9 - 8.8 95% C.I.)
	Prevalence of moderate malnutrition by MUAC (115-125 mm)	(18) 4.6 % (2.9 - 7.1 95% C.I.)
	Prevalence of severe malnutrition by MUAC (< 115 mm)	(5) 1.3 % (0.5 - 2.9 95% C.I.)
Mortality (retrospective over 104 days prior to interview)		
Mortality results	Crude mortality rate(CMR) (total deaths/10,000 people / day)	1.03 (0.72 - 1.48)
	Under-five mortality rate(U5MR) (deaths in children under five/10,000children under five / day)	1.90 (0.97- 3.68)
Morbidity for the last 2 weeks		
Child illness in the last 2 weeks	Yes	61.6%
	No	38.4%
Proportion of children by type of sickness	Fever	60.7%
	Cough	24.8%
	Diarrhea	17.8 %
	Skin Infection	5.0%
	Eye infections	1.7%
	Others	7%
Health seeking behavior		
Treatment sought	Sought treatment WHERE?	96.9%
	• Hospital	17.8%
	• Primary Health Center	24.2%
	• Pharmacy	10.4%
	• Others (local chemist)	37.5%
	• Shops	3.8%
	• Traditional practitioner	2.9%

Conclusion and recommendations

The findings of the assessment depict a poor nutrition situation, above the WHO emergency threshold in both MMC and Jere LGAs which is being caused majorly by insecurity in Borno State which has been affected by the insurgency since 2009. This has resulted to high malnutrition levels which is contributed by an interplay of several contributing factors ranging from household food insecurity, childhood illnesses and limited nutrition programme coverage. This calls for urgent focus on nutrition programs which focus on both severe acute malnutrition and moderate acute malnutrition anchored on the community management of acute malnutrition. There is an urgent need for scale up of CMAM services in the area to cater for the children who are severely malnourished, as evidenced by the high SAM prevalence of 3.1%. Both the health facilities and community platforms should be utilized for management of acute malnutrition and should be supported with both supplies and human resources to be

fully operationalized. Community management of acute malnutrition (CMAM) approach should be scaled up, both with an emphasis of inpatient management of severe acute malnutrition and outpatient management of moderate acute malnutrition.

Due to the high rates of moderately malnourished children (16.1%), a blanket supplementary feeding programme is recommended to address the high numbers of malnourished children. However, concerted efforts are required to finalize and adopt the national guidelines for management of moderate acute malnutrition or related emergency nutrition response. An integrated approach is required for the health and nutrition interventions being implemented in the area, both by SPHCDA and other implementing partners, with a special focus on the integrated management of childhood illnesses (IMCI) into the nutrition interventions implemented. The health programs implemented at the primary health care centers should integrate nutrition outreaches in order to improve the coverage of the interventions, with a special focus on the host communities. The nutrition-specific programs implemented in the LGAs should also be complemented by a strong referral system of the malnourished children in the community which should also incorporate active case finding and defaulter tracing. In addition health and nutrition programs implemented requires to integrate social behaviors change communication (SBCC) strategies in order to improve the nutrition situation.

Lastly, there is an urgent need to adopting a multi-sectoral approach in addressing the multiple causes of malnutrition, as evidenced by the survey results which range from increased morbidity, , limited coverage of the nutrition and health interventions, coupled by the context of loss of livelihoods, poor water and sanitation, insecurity and instability which has contributed to the influx of the IDPs, leading to strained available resources. This therefore calls for concerted efforts between the state & national governments and the implementing partners in both MMC and Jere in order to address the poor malnutrition situation.

INTRODUCTION

As per the recent humanitarian needs overview report by OCHA (Nov, 2015), there are 2.1 million children under 5 and 400,000 pregnant and lactating women (PLW) without sufficient nutrition in Adamawa, Borno and Yobe. This is mainly driven by the disruption of basic services, poor infant and young child feeding practices, rising food insecurity, inadequate access to markets, decreasing access to safe water and sanitation, and declining availability of health services. The report also highlights that the rates of IMCI illnesses are on the rise; accentuated by childhood malnutrition, this will further exacerbate the nutrition situation. These trends are all closely linked to the ongoing conflict and displacement. Children suffering from SAM are nine times more likely to die than their healthy peers, and chronic malnutrition under the age of 2 leads to irreversible cognitive impairments that prevent affected children from reaching their full potential. Chronically malnourished children are also more likely to drop out of school, and less likely to work as adults. In terms of the nutrition situation, the National Nutrition and Health survey indicated that the prevalence of global acute malnutrition in Borno was at 11.5% (GoN/ UNICEF, 2015) and the child stunting prevalence in the north-east is 42.5%. This presents an immediate threat to the lives of children as well as life-long consequences for survivors, as a GAM value of more than 10%

generally identifies an emergency. In addition, some of the main gaps identified include community Management of Acute Malnutrition (CMAM) centers are overburdened with an increase of 49% and 33% of new admissions of IDPs from camps in Borno and Yobe respectively between January 2013 and December 2015 (UNICEF, 2015). Screening and treatment capacities built before the hostilities enabled an early response. However, 55 health facilities offering nutrition services have closed, affecting a catchment area of more than 300,000 children under 5 in Borno and Yobe States. There is a gap in provision of supplementary feeding for children affected with Moderate Acute Malnutrition (MAM) and for PLW with acute malnutrition, mainly due to lack of the National protocol for management of moderate acute malnutrition and in part due to the decreasing number of trained health care workers due to conflict-related displacement or transfers. In addition, insecurity has limited the ability to collect state- and LGA-level data, e.g. mortality trends. Comparative data on the proportion of malnutrition among the IDPs in camps/centres, in host communities and amongst the local population has not been collected. As for the health situation, the NDHS 2013 figures for health indicators show already lower than national levels for the north-east. Conflict has worsened this situation and directly affected the ability of health facilities to provide adequate services. The destruction or damage of health infrastructures and lack of trained health care workers and medical supplies have resulted in an urgent need for integrated primary health care (PHC) services for 3.7 million IDPs and members of the host community population. While more comprehensive health data needs to be collected, assessments show increasing mortality and morbidity in the absence of better PHC coverage.

Objectives

The overall goal of the proposed small-scale SMART nutrition survey was to assess the nutritional status of children less than 5 years of age.

Specific Objectives

- a) To estimate the prevalence of acute malnutrition of children aged 6-59 months
- b) To estimate the retrospective Crude and under five Mortality rates.
- c) Determine the occurrence of morbidity in children aged 6-59 months.

METHODOLOGY & SURVEY IMPLEMENTATION

Study Design

The Small Scale Survey (SSS) adopted a cross-sectional design with two-stage cluster sampling based on the SMART methodology with the clusters being selected using the probability proportional to population size (PPS). Stage one sampling involved the sampling of the clusters to be included in the survey while the second stage sampling involved the selection of the households from the sampled clusters.

Target population Group

The assessment targeted children aged 6-59 months and their caregivers whereas all households formed the population for retrospective mortality in MMC and Jere LGAs.

Survey Sampling

Sample size calculation

A sample size of 30 clusters by 14 households (420 households) was used for the small-scale survey methodology and was expected to be enough to ensure representativeness with acceptable precision.

The typical sample size of a Small Scale SMART survey is 25 clusters by 10 households, but when retrospective mortality is added to the survey, the sample size must be increased, and a 30 clusters by 14 households is recommended by Global SMART guidelines (2014) and Centers for Disease Control (CDC) on rapid/small scale nutrition surveys.

Cluster and Household Selection

a) First Stage

Since a 2-stage cluster sampling was used, the first stage involved all communities/villages which were included in the initial sample selection with each community/village considered a cluster. All villages in MMC and Jere were included in the initial sample selection with each village considered a cluster and clusters were sampled with probability proportional to size. All villages along with their respective populations were entered into the ENA software (July, 2015) and clusters selected accordingly. The cluster consisted of 200-250 households as recommended by the Global SMART methodology. The villages/ communities were derived from the Population Commission- Borno and National Bureau of Statistics- Borno and was updated accordingly from the State Primary Health Care Health Development Agency- Borno (SPHCDA) which had recent population estimates (March 2016) for the populations in both MMC and Jere. Since the enumeration areas (EAs) provided by the Population Commission- Borno were small in size, with an average of 211 inhabitants (equivalent to 48 households), the survey included several EAs per SMART clusters (with a preferred minimum cluster size of 250 households). Satellite imagery was used to determine the demarcations of the clusters.

b) Second stage

At stage two each team used the simple random sampling method in household selection. Prior to data collection and upon arrival to the selected clusters, the survey teams listed all the households in all the selected clusters with the help of the local guides/community chiefs/ bulamas/ lawans. This updated lists provided current and accurate population information of the selected communities. Within the randomly selected households all children 6-59 months fitting the inclusion criteria were measured while mortality survey was administered in all the selected households.

A household was defined as persons or group of persons related or unrelated by blood, residing in the same compound, having one household head and eating from the same pot.

Survey Implementation

Survey details (proposed methodology) were shared with UNICEF and SPHCDA-Borno prior to the survey exercise and after the survey for the preliminary results. Information for population estimates for both MMC and Jere was acquired from the Population Commission- Borno with the support of the National Bureau of Statistics- Borno and information on current

population estimates triangulated and updated with information from the State Primary Healthcare Development Agency (SPHCDA) M&E department.

Survey team recruitment

This was conducted on 1st April 2016 by the AAH. The recruitment of Survey team was done based on their prior experience in a similar nutrition surveys, educational background and demonstrable technical expertise. 5 Officers from both the National Bureau of Statistics-Borno and State Primary Healthcare Development Agency (SPHCDA) were also included to be part of the survey teams during data collection.

Survey training

The teams were intensively trained for five days from 4th - 8th April 2016 at Barwee Hotel-Borno. These included 10 enumerators, 5 officials from SPHCDA, 6 officials from NBS and AAH team. The training focused on survey objectives, methodology, anthropometric measurements, field procedures, interviewing techniques, administration of the survey tools. Standardization test and field test were conducted as part of the training. Standardization test was to evaluate accuracy and precision of the survey enumerator's measurements, each enumerator took measurements of 10 children (aged 6-59months) twice.

Data collection period

The survey was conducted from the 11th to 16th April, 2016 for data collection of both the SMART data on nutrition, mortality & morbidity data.

Survey management and organization

The survey had five teams each comprising of one team leader and two Survey Assistants. The team leaders were from the SPHCDA and NBS- Borno who were part of the training and had previous extensive experience in conducting surveys. In addition, each team had one AAH staff who had technical expertise on the SMART survey methodology to enhance quality assurance. The teams were actively supervised by AAH Surveillance Specialist and UNICEF-Borno representative staff who were on the field with the survey teams.

Each team was assisted by a village guide (proposed at the village level by the local leaders) to lead and guide the survey team within the village in locating the selected households. The guide had a good knowledge of the clusters selected and in identifying the selected households.

Data collection and field work

a) Anthropometric survey

Structured questionnaires coded into Open Data Kit (ODK) software were used to collect anthropometric and morbidity data from all children within the eligible age range (6-59 months) using anthropometric questionnaire. SMART phones were used in the data collection process. The collected anthropometric data included:

- **Age:** The age of the children was determined using a local calendar of events (no birth records available).
- **Sex:** Male or female
- **Weight:** Children's weights were taken without clothes using SECA digital scales (100 g)
- **Height/length:** Children were measured using wooden UNICEF measuring boards (precision of 0.1 cm). Children less than 2 years were measured lying down, while those above 2 years were measured standing up.

- **Mid-upper arm circumference:** MUAC measurements were taken at the mid-point of the left upper arm using child tapes (precision of 0.1 cm). Maternal MUAC tapes were used for the caregivers assessed.
- **Bilateral pitting Oedema:** Assessed by the application of normal thumb pressure on both feet for three seconds. Occurrence of pitting oedema on both feet upon release of the fingers indicated nutritional oedema classified as severely malnourished.

b) Child Morbidity

Two-weeks retrospective morbidity data was collected from mothers/caregivers of all children included in the anthropometric measurement. The mother/caregiver was asked whether or not the child had diarrhoea, cough, fever, skin infection and eye infection in the two weeks preceding the survey.

c) Mortality

Retrospective mortality data was collected in all the visited households, including those with no children aged 6-59 months. A recall period of 104 days was used. Information was collected on the age and sex of the household members, the number of household members present within the recall period, the number of persons who arrived on or left within the recall period, the number of births and deaths over the recall period and pregnancies during the recall period. The cause and location of death was also captured. Individual Mortality questionnaire was used to collect data.

d) Data quality & Analysis

The recruitment of highly qualified survey team, training of survey assistants with emphasis on age estimation using calendar of local events, standardization test, piloting, close supervision of the teams by the AAH staff, daily meetings during data collection to address challenges, data entry completed on a daily basis, and daily plausibility checks ensured the quality of the data collected in the field. In addition, the team leaders were from the SPHCDA and NBS- Borno who were part of the training and had previous extensive experience in conducting surveys. Each team had one AAH staff who had technical expertise on the SMART survey methodology to enhance quality assurance. The teams were actively supervised by AAH Surveillance Specialist and UNICEF- Borno representative staff who were on the field with the survey teams.

Data management and analysis was done using ENA for SMART software (July 9th, 2015 update) for entering and analyzing anthropometric and mortality data. Morbidity data was analyzed using Excel.

Results

Demographic characteristics

A total of 407 households were visited for mortality survey. Of these, 76.1% were residents of the survey areas while 23.9% internally displaced persons (IDPs). The total population sample was 2611. This information is as summarized in the table below.

Table 2: Survey demographics results

Parameters	Results
Total number of households	407
Total population sampled	2611
Males	1290.5
Females	1320.5
Sex Ratio	0.97
Average household size	6.4
Total population of under 5	455
% of under-five population	17.4

Anthropometry results (Based on 2006 WHO standards, SMART and age 6-59m exclusion criteria)

A total of 393 children (194 boys, 199 girls) aged 6-59 months were assessed for their nutritional status through anthropometric measurements from 407 households out of the 420 households planned registering a non-response rate of 3.1%. The sample size was achieved.

The data analysis for WHZ was done with 386 children. This was based on the SMART exclusion criteria and age was used as the inclusion criteria while height was not used. This is as recommended globally for high stunting countries and a recommendation by Nutrition sector led by Federal Ministry of Health of Nigeria.

The overall data quality was scored as good (score of 3%, see annex 2 plausibility check on anthropometric results), and the standard deviation (SD) for WHZ was 1.09. Design effect for WHZ <-2 was 1.45 and poisson distribution score was $p=0.044$ which indicated pockets of malnutrition from the survey area.

a) Distribution by sex and age

The ages of the children were determined by recall using the calendar of local events developed by the survey teams during the training. This is as shown in the table below which shows a normal distribution of the sampled age groups.

Table 3: Distribution by age and sex

AGE (mo)	Boys		Girls		Total		Ratio Boy: girl
	no.	%	no.	%	no.	%	
6-17	35	45.5	42	54.5	77	19.6	0.8
18-29	59	51.3	56	48.7	115	29.3	1.1
30-41	48	53.9	41	46.1	89	22.6	1.2
42-53	41	45.6	49	54.4	90	22.9	0.8
54-59	11	50.0	11	50.0	22	5.6	1.0
Total	194	49.4	199	50.6	393	100.0	1.0

As shown above, among the surveyed children, boys and girls were equally represented (boys/girls ratio was $p=0.801$). The age ratio of 6-29 months to 30-59 months was 0.96, meaning there was good representation of the age groups with a slightly more children in the 30-59 months age group. (The value is expected to be around 0.85).

b) Wasting

Estimation of prevalence of malnutrition was done based on WHO 2006 standards. The prevalence of Global Acute Malnutrition (GAM) was 19.2 % (14.7 - 24.6 95% C.I.) and the

prevalence of Severe Acute Malnutrition (SAM) was 3.1 % (1.6 - 6.0 95% C.I.) The nutrition situation is critical (above the emergency/critical level of 15% according to the WHO classification). According to the results, boys were slightly more affected by malnutrition as compared to the girls. However, this was not statistically significant. This is as shown in the table below.

Table 4: Prevalence of malnutrition by Weight for Height

	All n = 386	Boys n = 190	Girls n = 196
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(74) 19.2 % (14.7 - 24.6 95% C.I.)	(41) 21.6 % (15.4 - 29.4 95% C.I.)	(33) 16.8 % (12.0 - 23.1 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(62) 16.1 % (12.8 - 19.9 95% C.I.)	(32) 16.8 % (12.5 - 22.4 95% C.I.)	(30) 15.3 % (10.7 - 21.4 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(12) 3.1 % (1.6 - 6.0 95% C.I.)	(9) 4.7 % (2.0 - 10.8 95% C.I.)	(3) 1.5 % (0.5 - 4.8 95% C.I.)

The prevalence of oedema is 0.0 %

The above information is as demonstrated in the figure below by the Gaussian curve which depicts a normal reference population distribution as per the WHO standards as compared with the surveyed population which shows that the population is skewed to the left of the normal distribution, which indicates malnutrition levels.

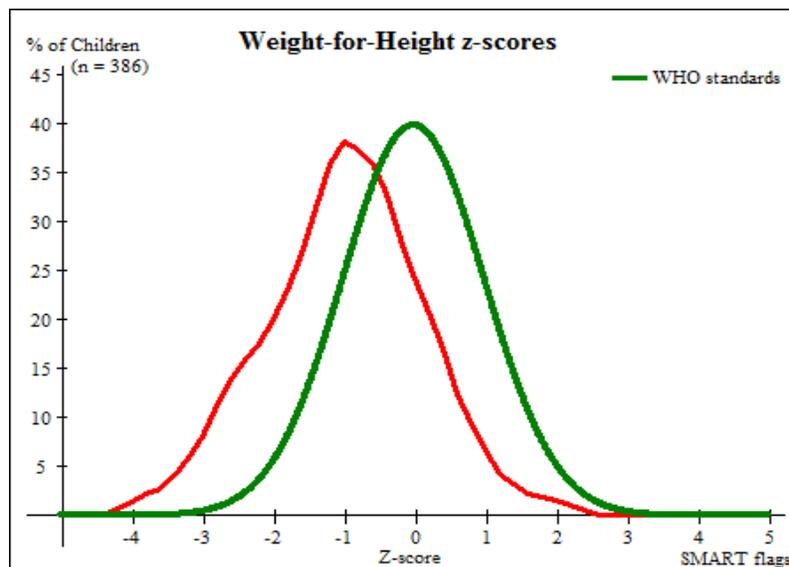


Figure 1: Distribution of W/H Z-scores for Sampled Children

Figure 1 depicts the WFH z-score distribution curve of the survey sample relative to the WHO-Gaussian curve. The findings indicate a slight shift to the left of the sample curve which indicates poor nutrition status of the sampled population in comparison to the reference population. The standard deviation SD for WHZ was 1.09, (which lies within the acceptable range 0.8 - 1.2), indicating representativeness in the sample selection. The prevalence of

GAM based on MUAC was 5.9% [3.9 - 8.8 95% C.I.] and SAM based on MUAC was 1.3% [0.5 - 2.9 95% C.I.].

c) Harmonization and explanation for GAM rates by MUAC and WHZ scores

In explaining the differences of the GAM rates by MUAC (5.9%) and by WHZ score (19.2%), the age distribution shows that we have slightly more children over the age of 24 months (2 years) as compared to the younger children (<2 years) which causes the WHZ score to detect the older children to be malnourished as compared by MUAC which normally is sensitive to the younger children. From the results, children aged < 2 years are 124 children as compared to 269 children who are above 2 years out all the 393 sampled children (N). The results show that the older age group are detected to be malnourished by WHZ score GAM as compared to MUAC GAM which is sensitive to the younger children.

d) Underweight

The prevalence of underweight was 28.1 % [22.8 - 34.1 95% C.I.]As was the case of acute malnutrition between boys and girls, there was no statistical significant difference in the level of underweight between the boys and girls as they were both equally vulnerable to be affected by malnutrition. This is as shown by the table below:

Table 5: Prevalence of Underweight by weight for age

	All n = 391	Boys n = 193	Girls n = 198
Prevalence of underweight (<-2 z-score)	(110) 28.1 % (22.8 - 34.1 95% C.I.)	(62) 32.1 % (25.5 - 39.6 95% C.I.)	(48) 24.2 % (18.2 - 31.5 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(76) 19.4 % (15.7 - 23.8 95% C.I.)	(39) 20.2 % (15.3 - 26.2 95% C.I.)	(37) 18.7 % (13.2 - 25.8 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(34) 8.7 % (6.4 - 11.7 95% C.I.)	(23) 11.9 % (8.0 - 17.4 95% C.I.)	(11) 5.6 % (3.5 - 8.7 95% C.I.)

e) Stunting

Stunting is an indicator of chronic (long-term) malnutrition which is mainly due to long term food deprivation, micronutrient deficiencies, recurrent illnesses and other factors which interrupt normal growth. Findings indicated an overall global chronic malnutrition prevalence of 30.7 % (25.8 - 36.2 95% C.I.) and severe chronic malnutrition prevalence of 11.4 % (8.7 - 14.8 95% C.I.) Stunting was slightly higher among boys 36.6 % (29.9- 44.0 95% C.I.) than girls 25.0 % (18.4 - 33.0 95% C.I.) However, there was no significant difference in the level of stunting between the boys and girls indicating that boys and girls are at equal risk of being stunted .This is as shown in Table 6:

Table 6: Prevalence of Stunting by weight for age

	All n = 387	Boys n = 191	Girls n = 196
Prevalence of stunting (<-2 z-score)	(119) 30.7 % (25.8 - 36.2 95% C.I.)	(70) 36.6 % (29.9 - 44.0 95% C.I.)	(49) 25.0 % (18.4 - 33.0 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(75) 19.4 % (14.8 - 24.9 95% C.I.)	(39) 20.4 % (14.7 - 27.6 95% C.I.)	(36) 18.4 % (12.6 - 25.9 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(44) 11.4 % (8.7 - 14.8 95% C.I.)	(31) 16.2 % (11.8 - 21.8 95% C.I.)	(13) 6.6 % (3.6 - 11.9 95% C.I.)

Maternal Nutrition

Adequate maternal nutrition, is important since it directly influences the nutrition status of the children. Women malnutrition results in increased susceptibility to infections, slow recovery from illness, and a heightened risk of adverse pregnancy outcomes which in essence increases the risk of malnutrition for herself and her baby. Women of reproductive age (15-49 years) and pregnant & lactating women were included in the survey analysis where MUAC measurements were taken. Women with less than 21.4cm MUAC reading were considered severely malnourished while women with less or equal to 22.1cm were considered as malnourished. Since increases of MUAC during pregnancy are generally less than 0.5 cm, the same parameters were used for the pregnant and lactating women. From the survey results, from the women of reproductive age (N=394), 4.8% were severely malnourished (<21.4 cm), while 6.9% were malnourished (<22.1 cm). For the women who were pregnant or lactating (N=249), 7.2% were severely malnourished (<21.0 cm) while 92.8% were above the cutoff point of malnutrition (<21.0 cm). This is as shown in the figure below.

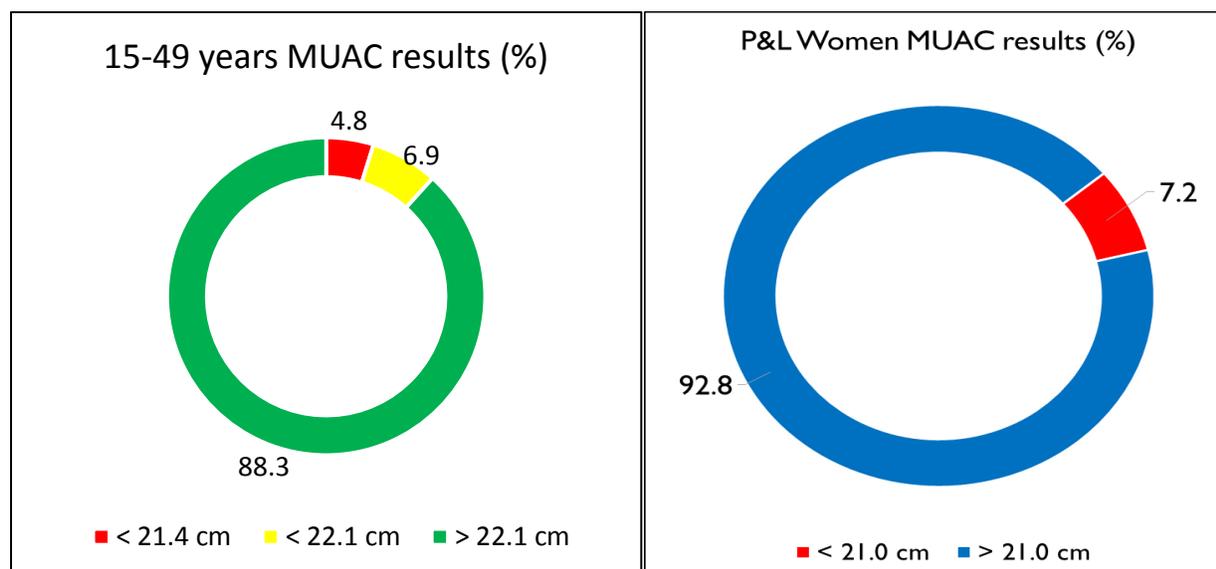


Figure 2: Maternal nutrition

Child Morbidity and Health Seeking Behavior

Retrospective morbidity data was collected among children 6-59 months (two-week recall) to assess the occurrence of main diseases. Results showed that 61.8% (n=233) of children were reportedly sick in the two weeks prior to the survey (Figure 3). Among children reported sick, 60.7% (n=147) had episodes of fever, 24.8% (n=60) of cough, 17.8% (n=43) of diarrhea, 5.0% (n=32) of skin infection, 1.4% (n=4) of eye infection and 7.0% (n=17) had other illness. This is as depicted in the figure below:

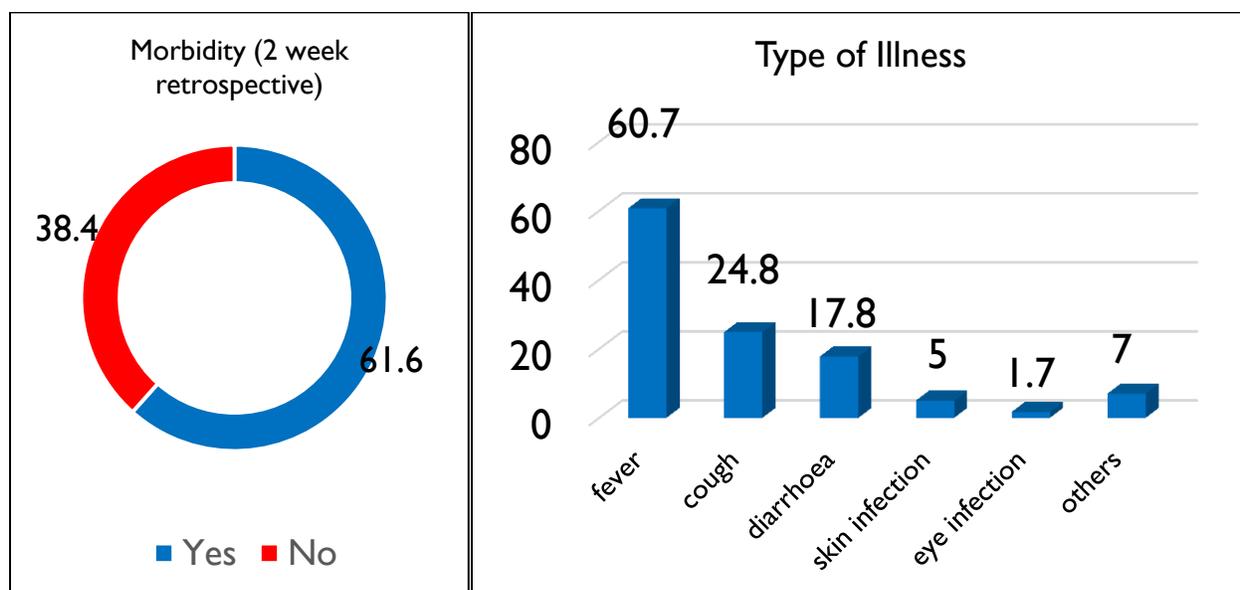


Figure 3: Prevalence of Morbidity (2-week recall period)

Health seeking behaviour was assessed by asking the respondents what they did the last time the child was sick. Quality of health care services and duration taken before a sick child receives medical attention contributes to the severity of illness. Survey findings indicate a good health seeking behaviours by the caregivers with majority of the caregivers seeking assistance. Of those who sought assistance, (17.9%) sought assistance from the hospital, 24.2% from the primary healthcare centres, (PHC), 10.4% from the pharmacy, 37.5% from the local chemists, 3.8% from the shops and 2.9% from the traditional practitioners. This is as depicted in the figure below.

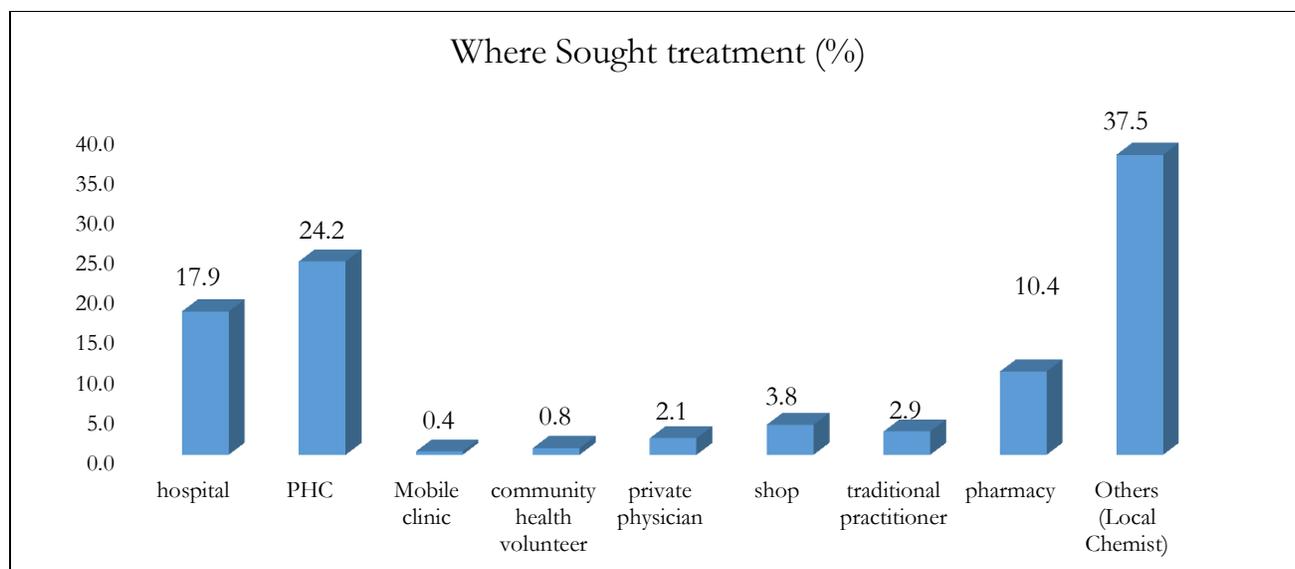


Figure 4: Health seeking behavior

Mortality

The retrospective mortality rate was calculated based on data collected on the 104 day recall. Out of 420 households planned to be sampled for mortality data, data was collected in 407 households.

There were 2611 individuals recorded as present during the recall period, 455 of whom were children under 5 (17.4%). Among all deaths recorded (n=28), 10 occurred in persons aged 18 - 49 years, 9 in under-fives, 5 in 5-9 years age group, 3 in 50-64 years age group and 1 in 65-120 years age group.

The Crude Mortality Rate (CMR) was 1.03 deaths per 10,000 per day [0.72 - 1.48, 95 CI] while the Under 5 Mortality Rate (U5MR) was 1.90 deaths per 10,000 per day [0.97 - 3.68, 95% C.I.], as summarized in table 8 below. The CMR mortality rates were classified as serious as per the WHO thresholds¹ and especially for the U5MR. This is as summarized in the table below:

Table 7: Mortality results based on 90 day recall

Parameters	Results
Number of current HH residents	2611
Number of people who joined HH	39
Number of births during recall	16
Number of deaths during recall	28
Number of current HH residents <5years old	455
Recall period (days)	104
CMR(deaths/10,000/day)	1.03 [0.72 - 1.48, 95% CI] DEFF 1.00
U5MR(deaths in children <5/10,000/day)	1.90 [0.97 - 3.68 95% CI] DEFF 1.00

¹WHO emergency threshold of <2deaths/10,000/day (U5MR) mortality rate and <1 death/10,000/day Crude Mortality Rate(CMR)

Of the deaths recorded during the recall period 32.1% were caused by injury/traumatic, 14.3% were caused by illness and 53.6% unknown. 67.9% of the deaths reported to have occurred in the current place and 21.4% during migration and 10.7% occurred in the last residence.

Further analysis is done of the population demographics which on disaggregation of the data by gender, the results show that the males are slightly affected with more mortality cases as compared with the females with CMR of 1.34 (0.89 - 2.01) and 0.73 (0.37 - 1.41) respectively. This is as depicted by the following population demographic pyramid.

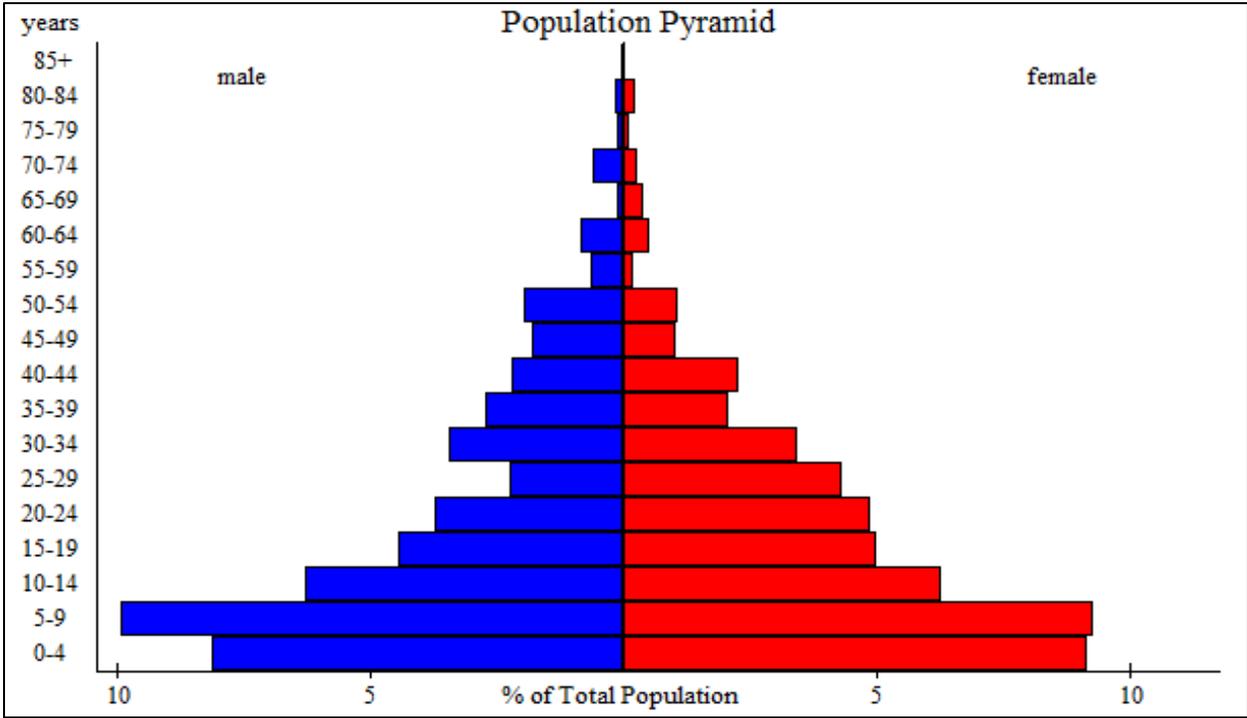


Figure 5: Population pyramid

DISCUSSION

Based on the WHO standards for classification of malnutrition, the nutrition situation is classified as emergency. The table below interprets the nutrition indices as per the WHO classification:

Table 8: WHO classification of malnutrition

Index	Wasting <- 2 SD %	Underweight <- 2 SD %	Stunting <- 2 SD %
Low	<5%	<10%	< 20%
Medium/ Poor	5- 9%	10- 19%	20- 29%
High/ Serious	10-14%	20-29% (28.1%)	30- 39% (30.5%)
Emergency/ Critical	≥ 15% (19.2%)	≥ 30%	≥ 40%

The results indicate that children aged 6-59 months are also affected by malnutrition as evidenced by the global acute malnutrition prevalence of 19.2 % [14.7 - 24.6 95% C.I.] which is classified as an emergency nutrition situation as per WHO standards. Of the 19.2% affected by malnutrition, 16.1% were moderately malnourished while 3.1% were severely malnourished. The prevalence of underweight 28.1 % (22.8 - 34.1 95% C.I.) is also classified as high/ serious depicting a poor nutrition situation in Maiduguri Municipal Council (MMC) and Jere local government areas (LGAs). In addition, the stunting levels were also classified as high/ serious 30.5 % [25.5 - 36.0 95% C.I.]. The poor nutrition situation in the two MMC and Jere LGAs i.e. could be explained by an interplay of several basic, immediate and underlying factors that influence nutrition outcome as per the UNICEF conceptual framework on the causes of malnutrition.

As shown by the survey results, the morbidity of the children aged 6-59 months was high with 61.6% of the children being sick within the last 2 weeks and mainly suffering from the main childhood illnesses known to aggravate the nutrition situation of children aged under 5 years i.e. fever (60.7%), cough (24.8%), diarrhea (17.8%) etc. In addition, majority of the caregivers did not seek medical attention from the existing health systems i.e. primary healthcare and hospitals, but from alternative sources which included local chemists (37.5%), pharmacies (10.4%), shops (3.8%) etc. while 24.2% visited primary healthcare centers while 17.9% went to the hospitals. The high cases of diarrhea could be explained by the poor hygiene conditions as observed in the host communities during the assessment. This calls for increased focus and scale up on integrated management of childhood illnesses (IMCI) which can be addressed by the existing health programme being implemented by SPHCDA, MoH and various partners. In addition, the nutrition interventions implemented in the area by the partners require an integrated approach in order to offer integrated health and nutrition services. In addition, as shown by the results of the maternal malnutrition, the women of reproductive age were also affected by malnutrition. This was slightly higher for the pregnant and lactating women who were more vulnerable and malnourished as compared to the other women of reproductive age without pregnancy or lactating.

Secondly, due the influx of the IDPs in both of the LGAs (MMC and Jere), as evidenced from the survey results where 23.9% of the surveyed population was the internally displaced persons, which contributed to the increased malnutrition cases. This is also as highlighted by the International office of Migration (IoM) report (2015) that 92% of the internally displaced persons are living in the host communities. In addition, from the plausibility results, there was pockets of malnutrition from the surveyed population, as evidenced by the Poisson distribution ($p=0.044$) which demonstrated that the malnutrition cases were not normally distributed among the sampled clusters. This can also be explained by the strained access to food based by the loss of livelihoods of the internally displaced persons in the LGAs. According to OCHA Humanitarian bulleting (March 2016), the host communities where distributions are being made are seeing an influx of IDPs from other host communities, stretching resources and hence reported that the nutrition situation in Borno serious and deteriorating and hence calling for urgent attention. In addition, the rapid assessment highlighted in the report pointed to high prices of food commodities and reduced purchasing power of the host communities, which pre-disposed them to malnutrition. The volatility and instability of the region in terms of insecurity has greatly contributed to the poor nutrition situation and the serious crude mortality (1.03) and under five mortality (1.90) rates as shown by the survey results. Therefore, this shows the aggravating factors leading to the high levels

of malnutrition which calls for a multi-sectoral approach in addressing malnutrition in the area.

RECOMMENDATIONS

SHORT TERM RECOMMENDATIONS		
Theme	Recommendations	By Who
Health & Nutrition Situation	<ul style="list-style-type: none"> • Discuss, define a minimum package and plan increase in coverage of integrated health and nutrition services both at the primary health care centers and the activities implemented by the partners. A coordinated approach with a focus on maternal, infant and young child nutrition should be adopted, with a special focus on infant and complementary feeding and maternal nutrition programmes (IMCI + nutrition) • Consider Adopting mobile clinics and community outreaches in the host communities for the health & nutrition programmes and focus on community mobilization using the CMAM approach. • As part of health and nutrition services, urgent scale up of CMAM services (OTP) and increase of coverage in the 2 LGAs. The out-patient therapeutic program should be scaled up in the area and increase its coverage by setting up the program in other wards in order to address the severely malnourished children as a priority. This should have a special focus on the host communities that are hosting a majority of the IDPs. • Integrate basic water, sanitation & health (WASH) approach for the interventions being implemented in the LGAs. • Community screening of under-fives and active case finding and defaulter tracing should be adopted by the community volunteers and community health workers attached at the primary healthcare centers and working under implementing partners. • Strengthen the community referral system for malnourished children with a special focus on the host communities. Consider training of mothers for MUAC screening and referral. • Consider adoption of a Blanket Supplementary Feeding Program for children 6-59 months which should address the increased numbers of moderately malnourished 	SPHCDA/ MoH & Implementing Partners

	children in the LGAs as evidenced by the survey results. Pregnant and lactating women should also be considering for nutritional supplementation.	
LONG TERM RECOMMENDATIONS		
Theme	Recommendations	By Who
Nutrition	<ul style="list-style-type: none"> ✓ Increased advocacy efforts in the finalization of the moderate acute malnutrition treatment or related emergency nutrition response guidelines at the national level which is currently lacking and hence the gap in addressing the children who are moderately malnourished. Current guidelines recommend provision of nutritional counselling for MAM children. ✓ Further explore the causes of undernutrition in the specific Borno & jere LGAs to inform a multi sector approach with strong impact measurement. . 	SPHCDA/ MoH, State and National Government & Implementing Partners
Health	<ul style="list-style-type: none"> ✓ Revival and rehabilitation of the exiting primary health care centers in the LGAs in order to improve an integrated health and nutrition implementation which should be strengthened by joint supervision by the SPHCDA and the implementing partners. 	

CONCLUSION

The findings of the assessment depict a poor nutrition situation, above the WHO emergency threshold in both MMC and Jere LGAs which is being caused majorly by insecurity in Borno State which has been affected by the insurgency since 2009. This has resulted to high malnutrition levels which is contributed by an interplay of several contributing factors ranging from household food insecurity, childhood illnesses and limited nutrition programme coverage. This calls for urgent focus on nutrition programs which focus on both severe acute malnutrition and moderate acute malnutrition anchored on the community management of acute malnutrition. There is an urgent need for scale up of CMAM services in the area to cater for the children who are severely malnourished, as evidenced by the high SAM prevalence of 3.1%. Both the health facilities and community platforms should be utilized for management of acute malnutrition and should be supported with both supplies and human resources to be fully operationalized. Community management of acute malnutrition (CMAM) approach should be scaled up, both with an emphasis of inpatient management of severe acute malnutrition and outpatient management of moderate acute malnutrition. Due to the high rates of moderately malnourished children (16.1%), a blanket supplementary feeding programme is required to address the high numbers of malnourished children. However, concerted efforts are required to finalize and adopt the national guidelines for management of acute malnutrition. An integrated approach is required for the health and nutrition interventions being implemented in the area, both by SPHCDA and other implementing partners, with a special focus on the integrated management of childhood illnesses (IMCI) into the nutrition

interventions implemented. The health programs implemented at the primary health care centers should integrate nutrition outreaches in order to improve the coverage of the interventions, with a special focus on the host communities. The nutrition-specific programs implemented in the LGAs should also be complemented by a strong referral system of the malnourished children in the community which should also incorporate active case finding and defaulter tracing. In addition health and nutrition programs implemented requires to integrate social behaviors change communication (SBCC) strategies in order to improve the nutrition situation.

Lastly, there is an urgent need to further strengthen and increase coverage of multi-sectoral interventions in addressing the multiple causes of malnutrition, as evidenced by the survey results which range from increased morbidity, , inadequate coverage of the nutrition and health interventions. The results in addition to loss of livelihoods, poor water and sanitation, insecurity and instability which has contributed to the influx of the IDPs and led to strained available resources. This therefore calls for concerted efforts between the state & national governments and the implementing partners in both MMC and Jere in order to address the poor malnutrition situation.

ANNEXES

Annex 1: Selected clusters

Village/ Community name	Population	Cluster Number
Sanda Gaidam Area	2705	1
Shuwari 1& 2	2235	2
Alh/ Flour Mills Area	1865	3
Umarari Bus-Stop/ Area	2355	4
Ngarannam Area	4905	5
Zajeri	4720	6
Bulumkutu Kasuwa Lay	3640	7
Bulumkutu Abuja	2470	8
Damboa Road/ Nnpc Area	2515	9
Moduganari	2430	10
Alamin Dagash/ 2nd Circular road	3545	11
Layin Lawan	1625	12
Bakin Gada Area	2250	13
Layin Zango Lilo	1305	14
Sabon Layi	3425	15
Gamboru Bukar Marte Street	4200	16
Kangelifaya	1740	17
Jerusalem	2245	18
Jiddari Layin	3070	19
Bulabulin Layin Sam	3200	20
Fori Dan Kura/ Royal Side	3045	21
Gongulong Kal/M/Ajiri	2295	22
Layin Railway	2305	23
M.M/ Customs	3120	24
Goni Kachallari Area	2205	25
Allamin Shuwa	3325	26
Layin Fg	2350	27
Kuwait Block Ten	4195	28
Bulama Tela/ Zare	3115	29
Kasuwan Ngomari	2455	30
Shagari Lowcost A	1100	RC
Layin Makabarta	1610	RC
Bulama Dan Ali	3125	RC

Annex 2: Plausibility Results

	Value	Comment
Missing/Flagged data	1.9%	Excellent
Overall Sex ratio	p =0.959	Excellent
Overall Age distribution	p =0.550	Excellent
Dig preference score - weight	0	Excellent
Dig preference score - height	2	Good
Dig preference score - MUAC	0	Excellent
Standard Dev WHZ	1.09	Good
Skewness WHZ	-0.12	Excellent
Kurtosis WHZ	-0.02	Excellent
Poisson dist WHZ-2	p=0.044	Good
Overall	3%	Excellent

Annex 3: Mortality Questionnaire

DEMOGRAPHY & MORTALITY QUESTIONNAIRE

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

STATE:	LGA:	NAME OF INTERVIEWER:
WARD:	COMMUNITY:	HH STATUS: RESIDENT [] or IDP []
CLUSTER NO. [][]	TEAM NO. [][]	HOUSEHOLD ² NO. [][]

01	02	03	04	05	06	07	08	09	10
No.	Name	Sex (M/F)	Age (years)	Joined on or after:	Left on or after:	Born on or after:	Died on or after:	Cause of death 1= illness 2=injury 66=unknown	Location of death 1=current location 2=during migration 3=in place of last residence 4=other
				_____ (Start date of the recall period - ex. Jan. 1, 1900)					
WRITE 'Y' for YES. Leave BLANK if NO.									

a) List all the people that are currently living in this household.

1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									

b) List all the household members that have left this household (out migrants) since the start of the recall period.

1					Y				
2					Y				
3					Y				
4					Y				
5					Y				

c) List all the household members who died since the start of the recall period.

1							Y		
2							Y		
3							Y		
4							Y		
5							Y		

Has anyone in the household pregnant at the start of the recall period? No [] Yes [] If yes, how many? ____

² HH definition: Group of people living under same roof & sharing food from the same pot for a period of at least 6 months. In home with multiple wives, those living and eating in different houses are considered as separate HHs. Wives living in different houses and eating from same pot are considered as one HH.

Annex 4: Anthropometry Questionnaire

ANTHROPOMETRIC & HEALTH QUESTIONNAIRE														
(To be conducted in EVERY HH with children 6-59)														
Date (D/M/Y):/...../..... Cluster No: Team No: State: LGA: Ward: Community:														
1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	1.1	1.11	1.12	1.13	1.14	1.15
Child no.	HH ref. no.*	Sex ----- - m = Male f = Female	Age in months (use local calendar of events)	Weight in Kg	Height in cm	Oedema ----- n = No y = Yes	Child MUAC in cm	Maternal Age (15-49 years) - ----- -----	Maternal MUAC in cm	Is mother/caregiver pregnant or lactating? 0 = No 1 = Yes (Pregnant) 2 = Yes (Lactating)	If malnourished, is child enrolled in treatment programme? 0 = No 1 = yes, in OTP 2 = yes, in SC 99 = n/a	Illness in past 2 weeks? ----- -- 0 = No 1 = Yes If no, END SURVEY	Type of Illness 1 = Fever* 2 = Cough** 3 = Diarrhea 4 = Skin Infections 5 = Eye infections 66 = Other (specify)	Treatment sought 0 = None 1 = Hospital 2 = PHC 3 = Mobile /outreach clinic 4 = Village health care worker 5 = Private physician 6 = Relative/friend 7 = Shop 8 = Traditional practitioner 9 = Pharmacy 66 = Other (specify)
1														
2														
3														
4														
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6														
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10														
11														
12														

HH definition: Group of people living under same roof & sharing food from the same pot for a period of at least 6 months. In home with multiple wives, those living and eating in different houses are considered as separate HHs. Wives living in different houses and eating from same pot are considered as one HH.