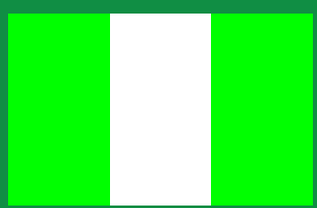
NATIONAL NUTRITION AND HEALTH SURVEY (NNHS) 2018



REPORT ON
THE NUTRITION AND HEALTH SITUATION OF NIGERIA

JUNE 2018

Foreword

The 2018 National Nutrition and Health Survey (NNHS) was conducted by the National Bureau of Statistics (NBS), in collaboration with the National Population Commission (NPopC) and the Nigeria Federal Ministry of Health. Financial support was provided by the Government of Nigeria, United Nations Children's Fund (UNICEF), United States Agency for International Development (USAID) and Department for International Development (DFID). Technical Support was provided by UNICEF and the Government of Nigeria through NBS.

NNHS is a household survey conducted using Standardized Monitoring and Assessment of Relief and Transition (SMART) methodology. NNHS is conducted annually and this is the third national level survey, the first and second being in 2014 and 2015 respectively. NNHS provides up-to-date information on the situation of nutrition and health and measures key indicators that support the country to monitor progress of Saving One Million Lives (SOML) Program for Result (PforR) initiative and other national and international goals.

National Bureau of Statistic (2018)
Main Report, Abuja Nigeria

Foreword

The Federal Government of Nigeria in line with its role of providing strategic direction for the Health Sector initiated the “Saving One Million Lives Programme for Result” (SOML-PforR). This was conceived by the Federal Ministry of Health as a strategy to save the lives of mothers and children by increasing access to, and utilisation of evidence-based, cost-effective and high impact maternal, child and nutrition interventions in Nigeria.

The Programme is a results-focused partnership with the State Ministries of Health, financed by a $500million International Development Association (IDA) credit to the Federal Republic of Nigeria over a period of 4 years. It is based on an approach of structuring the flow of resources to pay for results—desired goals, outcomes, and impacts—rather than simply paying for processes or reimbursing activity costs.

The National Nutrition and Health Survey (NNHS) is a household survey using 'Standardized Monitoring and Assessment of Relief and Transition' (SMART) methodology. The SMART methodology is an improved survey method that balances simplicity with technical soundness. It uses a two stage cluster sampling i) Enumeration Areas (EAs)/Cluster as Primary Sampling Unit and ii) The listed Households as Secondary Sampling Unit. The survey has an excellent data quality control mechanism.

This Report is the third national level NNHS survey, the first and second being in 2014 and 2015 respectively. Consequently, NNHS provides up-to-date information on the situation of nutrition and health and also measure the 'Saving One Million Lives Program for Results (SOML-PforR) key indicators and other health related indicators.

Availability of annual SMART Survey reports forms the bases for FGON to provide performance linked disbursement to States based on the quantity and quality of services provided at the Primary Health Care level. The dual benefit of improved health care and the accompanying financial incentive makes the annual NNHS a 'win-win' to the FGON and State government. This portrays the global paradigm shift of paying for performance to drive efficient and better health outcome.

In conclusion, I urge policy makers and program managers to focus on the outcome of this report and ensure that efforts should be made towards addressing all areas of concern in a concerted and coordinated manner. It is my hope that all stakeholders will play active roles in closing the gaps in the provision of high-quality health services to the Nigerian populace.

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Abuja.
October, 2018.

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List of Acronyms

ACT	Artemisinin-based Combination Therapy
ANC	Antenatal Care
ARI	Acute Respiratory Infection
CI	Confidence Interval
CMAM	Community-based Management of Acute Malnutrition
DFID	Department for International Development
DHS	Demographic and Health Survey
DPT	Diphtheria, Pertussis and Tetanus
EA	Enumeration Areas
EFB	Exclusive Breastfeeding
ENA	Emergency Nutrition Assessment
EPI	Expanded Programme on Immunisation
FCT	Federal Capital Territory
FGON	Federal Government of Nigeria
FMOH	Federal Ministry of Health
GAM	Global Acute Malnutrition
HAZ	Height for Age Z-score
HH	Household
IPTp	Intermittent Preventive Treatment in Pregnancy
ITN	Insecticide Treated Net
IYCFP	Infant and Young Child Feeding Practice
KAP	Knowledge Attitudes and Practice
LGA	Local Governmental Area
MAM	Moderate Acute Malnutrition
MDG	Millennium Development Goals
MNCHW	Maternal Newborn and Child Health Week
MICS	Multiple Cluster Indicator Survey
MMR	Maternal Mortality Rate
MTCT	Mother To Child Transmission
MUAC	Mid-Upper Arm Circumference
NBS	National Bureau of Statistics
NCHS	National Center for Health Statistics
NDHS	Nigeria Demographic and Health Survey
NIS	Nutrition Information System
NMCSP	National Malaria Control Strategic Plan
NNHS	National Nutrition and Health Survey
NPopC	National Population Commission

NSHDP	National Strategic Health Development Plan
NSPAN	National Strategic Plan of Action for Nutrition
ORIE	Operational Research and Impact Evaluation
ORS	Oral Rehydration Salts
ORT	Oral Rehydration Therapy
PBF	Predominant Breastfeeding
PENTA	Pentavalent vaccine
PHC	Primary Health Care
PPS	Probability Proportional to Size
PSU	Primary Sampling Unit
RDT	Rapid Diagnostic Testing
SAM	Severe Acute Malnutrition
SD	Standard Deviation
SMART	Standardized Monitoring and Assessment of Relief and Transition
SOML	Saving One Million Lives
SP	Sulphadoxine Pyrimethamine
UCI	Universal Child Immunization
UNHCR	United Nation High Commission for Refugees
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
VAD	Vitamin A Deficiency
WASH	Water Sanitation and Hygiene
WAZ	Weight for Age Z-score
WB	World Bank
WHZ	Weight for Height Z-score
WINNN	Working to Improve Nutrition in Northern Nigeria
WFP	World Food Program
WHO	World Health Organization

Executive Summary

Introduction:

This report presents the findings of the National Nutrition and Health Survey conducted in 37 domains (36 states and Federal Capital Territory (FCT) between February 19 and June 2, 2018; the third national survey conducted using SMART methodology by NBS, in collaboration with NPopC and the Nigeria Federal Ministry of Health and with technical support from UNICEF. The first NNHS was conducted in February-May 2014 and the second in July-September 2015. The main objective of the NNHS 2018 was to assess the current nutrition status of the population (especially children 0-59 months old and women of reproductive age (15-49 years old) at state, zonal and national levels; to assess infant and young child practices among 0-23 months, and to monitor the progress towards the Saving One Million Lives (SOML) goals which forms the basis for performance linked disbursement to States based on the quantity and quality of services provided at the Primary Health Care level[1],[2].

Methodology:

A two-stage cluster sampling methodology was used in selecting 36 clusters in each of the 37 states/domains and 20 households in each cluster. A total of 19,471 boys and girls (sex ratio 1.0) aged 0-59 months from 24857 households in 1,322 clusters (>95 percent accessed) were assessed for anthropometry and health status, of which 8124 children were aged 0-23 months and were assessed for infant and young child feeding (IYCF) practices. A total of 24,985 women aged 15-49 years were assessed for their nutrition status and reporoductive health using the NNNHS steering committe validated tool and protocol.

Data Quality Control

With elaborate and stringent measures put in place to ensure good quality of data, the evaluation report for the quality of the survey using the ENA software shows the quality of the survey is excellent with an overall plausibility score of 5 percent. As shown in Annex 1, the data quality is excellent in 34 states/domains and good in 3 states (Cross River, Kogi and Zamfara) with plausibility scores ranging from 0 to 12 percent.[3] The main quality control measures implemented were: 1) Rigorourus training of surveyors for 6 days (increased from 5) on the survey protocol – including sampling, interviewing and measurement techniques and use of mobile data collection skills by a

[1]National Malaria Strategic Plan (NMSP 2010), Millenium Deelopment Goals (MDGs 2015); Sustainable Development Goals (SDGs 2025), World Health Assembly Resolution (WHAR 2012), etc.
[2]Indicators identified as key to strengthen the overall health system in the country include: DPT3/Penta3 coverage, Vitamin A coverage, HIV testing during ANC, skilled birth attendant, modern contraceptive prevalence rate and use of mosquito nets.
[3]The lower the plausibity score, the higher the quality/reliability of the data/survey.

team of SMART certified consultant and survey managers. The training included standardization tests for measurers and field pre-test for tools and field conduct during data collection. 2) Recruitment of suitable surveyors – a part from picking the surveys from a list of experienced data collectors and supervisors from NBS data bank; the surveoys were evaluated using pre- and post-training tests, standardization test and field pre-test and the results used to dismiss, reserve or retain and assign them into different roles in the survey team. 3) Use of Mobile Data Collection techniques (ODK) in which the survey tool was programmed into the tablets with in-built filters and controls to minimise data entry and skip pattern errors in the questionnaire. 4) Supervision of data collection at three levels -the first level of supervision was provided by the team supervisors who were responsible for closely monitoring the work of the teams to ensure that all sampled households were visited and eligible children and women included, and that interviews and measurements are taken appropriately, the second level involved the regional coordinators who provided logistical and coordinating support to ensure smooth operations of their teams; while the third level of supervision was provided by the national survey coordinators- conducting spot check monitoring, quality feedback and adherence to the survey protocol. 5) Daily monitoring and control of data submissions for the different forms to the server – survey data, cluster control forms, cluster summary forms and the calibration forms. 6) Continuous data quality checks and control using ENA software and feedback to the teams through the NNHS2018 WhatsApp Chat room. Six such data-review and feedback reports were shared with the teams, leading to early detection of teams with errors, reconstituting or retraining the teams where necessary and this led into improving the performance and quality of data with subsequent reviews. 7) Systematic monitoring of the teams during field data collection by the consultant using a simple field monitoring checklist – reinforcing the adherence of the NNHS protocol and giving data quality control feedback to the teams.

Key Findings

Child and Women Nutrition:

The national GAM prevalence among children 6-59 months of age based on weight-for-height Z score and/or oedema was 7.0 percent (95% CI: 6.5-7.5) with MAM of 5.5% (95% CI: 5.1-6.0) and SAM of 1.5% (95% CI: 1.3-1.7) including 24 (0.1%) oedema cases. The rates indicate that acute malnutrition levels have remained at alert levels of 5-9.9% over the years since 2014. The prevalence of Underweight among children aged 0-59 months was 19.9 percent (95% CI: 21.5-23.4), just at the margin of the 20 percent threshold for serious situation that it has been since 2014, higher than the global estimate of 15 percent but consistent with the rates in the West and Central Africa region (22%). The prevalence of stunting was 32.0 percent (95% CI: 30.7-33.4) and has remained the largest burden of malnutrition with stagnated rates of above 30 percent since 2014, and with many states in the north west and north east recording prevalence above 40 percent- the WHO critical levels. Stunting indicates a long term nutritional problem in the country and at similar levels to that of Sub-Saharan region (37 percent) with serious and irreversible consequences. Overweight prevalence at 1.2 has

however remained below the 7 percent threshold in all the 37 domains. Overall, only 64 percent of children in Nigeria are growing healthily without being stunted or wasted.

The prevalence of MUAC-based Acute Malnutrition (MUAC<125 mm/oedema) for children 6-59 months was 4.7 percent (95% CI: 4.3-5.1), with moderate acute malnutrition (MUAC>=115 and <125 mm) rate of 3.7% (95% CI: 3.4-4.1) and severe acute malnutrition (MUAC<115 mm/oedema) rate of 1.0% (95% CI: 0.8-1.1). The national prevalence of acute malnutrition using MUAC (<221 mm) among Nigerian women in the reproductive age was 6.9 percent (95% CI: 6.5-7.4) with 3.8 percent (95% CI: 3.5-4.1) as severely malnourished (MUAC <214 mm), indicating a stable situation, consistent with previous nutrition survey conducted in 2015.

Disaggregated data show children and women from states in the northern geopolitical zones, boys (as compared to girls), younger children (0-23 months old compared to the 24-59 months old) and teenage women (compared to older women 20-49 years) at a higher risk of malnutrition. These results sound a warning to all stakeholders that efforts to invest on nutrition sensitive to geographic location, gender, and age of target population should be maintained to reduce acute and chronic malnutrition levels to below 5 percent and 20 percent respectively as envisaged in the national and international goals. Improving nutrition in the first 1000 days window and in adolescent girls is critical to improving the nutrition status of the entire population of Nigeria.

Infant and Young Child Feeding Practices:

Although breastfeeding is a widespread practice among the Nigerian population with nearly all the assessed children 0-23 months ever breastfed (97.1%), the other aspects of breastfeeding and young child feeding indicators are still poor and sub-optimal. More than 80 percent new-borns do not timely receive milk and colostrums within one hour of birth; only 27 percent of 0-5 months old infants are breastfed exclusively, and so majority are introduced to complementary foods before the age of six months earlier than the WHO/UNICEF's recommendation that mother's exclusively breastfeed their children, predisposing these children to unhygienic feeding conditions and vulnerability to illnesses. Nearly 60 percent of the children (6-24 months) assessed are not fed to the recommended minimum meal frequency for their age and breast feeding status; 65 percent do not meet the minimum dietarry diversity and only 17 percent children aged 6-23 months receives the minimum acceptable diet while less than 50 percent are fed on Iron-containing foods. There are significant variations in rates of breastfeeding and complementary feeding indicators and some states especially in South West, North West and North East regions would require more effort to promote optimum breastfeeding benefits.

Reproductive Health:

Reproductive health indicators follows a similar pattern of variability as malnutrition trends based on geopolitical zone and age group with states in the Southern region and older women reporting

better rates in terms of skilled attendance at delivery, use of contraceptive methods, antenatal care (ANC) coverage and HIV testing during ANC (at national prevalence of 46 percent, 25.5 percent, 74 percent, and 55 percent respectively).

For instance, skilled birth assistance is highest in the South East zone (88 percent) but lowest in the North West (22 percent), and is especially very critical in Sokoto, Zamfara, Jigawa, Katsina, Kebbi, Bauchi and Yobe states where more than 80 percent of all deliveries were not assisted by a skilled birth attendant. Contraceptive use is highest in the South West (50.9 percent) and but lowest in North East (5.2 perecnt) and North West (7.9 percent), despite its strong correlation with maternal mortality. And of the ANC was delivered by a skilled provider in 71 percent women who received ANC by a skilled provider, more were likely to be found in the South East (88 percent) and South West (85 percent) states than in the North West (60 percent). Specific family planning programs to improve access to skilled birth attendants and ANC, HIV testing and contraceptive use are thus recommended, especially in the North West and North East, where almost one in six women was found pregnant, but 70-80 percent of all pregnant women did not receive skilled care during childbirth, only 5-8 percent used any contraceptive method, and 30-40 percent did not attend the prescribed ANC.

Water and Sanitation:

The water and sanitation indicators are still sub-optimal in Nigeria with only 57 percent of households were reported to have access to an improved source, a slight improvement from 52 percent in 2015; and only 47 percent having access to improved sanitation facility. Only 53 percent of the children aged 0 to 3 years have their faeces disposed safely through use of toilet, rinsing into latrine/toilet or burying. South South, South West, and North West have the highest proportions of improved water source, improved sanitation facilities and safe child waste disposal respectively; while North East and North Central reported the lowest respective percentages for these public health indicators. Table 1 provides a summary of the findings for the key indicators at national and zonal levels.

Table 1. Summary of Key NNHS 2018 Findings

Indicator	Sample	Percent Prevalence (weighted)						
	Total (N)	National	NC Zone	NE Zone	NW Zone	SE Zone	SS Zone	SW Zone
Global Acute Malnutrition [GAM], (WHZ<-2/Oedema)	16,862	7.0	4.9	8.7	8.3	5.6	6.7	6.8
Severe Acute Malnutrition [SAM], (WHZ<-3/Oedema)		1.5	1.1	1.9	2.0	0.8	1.5	1.3
Global Acute Malnutrition (MUAC<125mm/Oedema)	16,906	4.7	4.5	5.8	5.7	2.9	3.1	3.6
Severe Acute Malnutrition (MUAC<115mm/Oedema)		1.0	1.0	1.5	1.4	0.3	0.5	0.5
Underweight (WAZ<-2)	18,859	19.9	15.6	26.5	25	19.0	16.1	17.0
Stunting (HAZ<-2)	18,781	32.0	29.7	42.8	50.4	17.2	20.4	20.8
Acute Malnutrition in Women (MUAC<221 mm)	23,798	6.9	4.8	10.8	10.6	3.7	4.6	5.0
Severe Acute Malnutrition, Women (MUAC<214 mm)		3.8	2.3	6.0	5.9	2.2	3.1	2.4
Children (12-23 months) who received any vaccine	3,976	79.3	83.1	73.0	56.9	95.6	89.4	92.8
Children (12-23 months) who received Penta3		57.2	49.7	48.4	28.7	82.9	74.2	78.5
Children (12-23 months) who received measles vaccine		64.7	69.2	61.4	39.8	81.1	73.8	80.2
Children (6-59 months) who received Vit A	17,438	40.8	27.2	44.1	30.7	32.3	43.9	64.0
Children (12-59 months) who received Deworming	15,323	40.4	26.8	36.1	25.8	60.3	45.8	55.9
Children (0-59 months) with diarrhea in prev 2 weeks	19,471	14.5	12.9	15.9	24.9	16.8	5.8	7.0
Children with diarrhoea who were treated with ORS	3,330	26.4	26.7	32.4	23.6	27.1	25.5	30.2
Children with diarrhoea who were treated with Zinc		24.1	15.9	42.0	27.7	14.0	16.7	12.5
Children (0-59 months) with cough in previous 2 weeks	19,471	22.4	23.2	20.7	22.4	34.5	22.8	15.4
Children (0-59 months) with ARI in previous 2 weeks		4.6	3.9	6.0	7.3	4.1	3.5	2.1
Children with ARI who were treated with antibiotics	999	35.5	40.1	18.8	29.3	54.4	35.5	64.0
Children (0-59 months) with fever in previous 2 weeks	19,471	21.5	18.6	18.0	26.6	29.5	27.3	10.2
Children with fever tested for malaria (RDT)	4,418	12.9	15.1	12.5	11.7	11.7	12.3	17.2
Children with fever treated with any antimalarial		41.0	34.3	42.3	35.7	47.1	40.5	57.2
Children with fever treated with ACT		17.0	11.9	15.8	8	26.2	19.7	34.5
Children (0-23 months) ever breastfed	8,124	97.1	96.1	96.7	97.6	96.7	97.9	97.2
Children (0-23 months) put to breat within first hour		19.2	25.4	16.4	13.3	18.2	42.8	7.5
Children (0-23 months) put to breat within first day		77.8	83.3	80.3	70.8	74.0	83.9	79.0
Children (0-5 months) exclusively breastfed	2,033	27.2	34.7	23.0	14.3	22.4	34.1	40.1

Table 1. continued

Indicator	Sample	Percent Prevalence (weighted)						
	Total (N)	National	NC Zone	NE Zone	NW Zone	SE Zone	SS Zone	SW Zone
Children (12-15 mo) continued breastfeeding at 1 yr	1,334	84.1	89.4	91.1	95	60.5	76.9	78.2
Children (20-23 mo) continued breastfeeding at 2 yrs	1,337	23.5	35.3	32.1	34.7	4.1	10.6	15.1
Children (6-23 months) had minimum dietary diversity	6,091	34.5	38.8	25.3	23.6	48.9	42.3	35.4
Children (6-23 months) had minimum meal frequency		40.2	48.9	43.8	35.9	47.4	27.1	42.6
Children (6-23 months) had minimum acceptable diet		16.5	20.0	17.3	12.1	23.4	12.8	18.1
Children (6-23 months) had iron-rich/fortified food		45.6	47.0	23.9	24	77.1	68.3	53.0
Women had live births by skilled birth attendant	8,329	46.0	55.3	30.3	21.8	87.9	57.0	77.0
Women had live births who had at 1 ANC visit		74.3	77.2	69.7	60.7	95.6	81.9	89.8
Women with live births had ANC by skilled provider		71.1	76.3	68.1	59.5	88.3	73.7	84.9
Women with live births offerred HIV test during ANC		56.7	59.7	59.3	44.3	68.4	60.2	70.7
Women with live births tested for HIV during ANC		54.6	58.3	56.4	42.2	67.5	59.2	67.2
Women with live births received results for HIV test		45.2	50.1	41.5	35.3	51.3	50.7	59.7
Women (15-49 years) married/in union using any contraceptive	16,678	25.5	20.4	5.2	7.9	44.5	42.9	50.9
Women (15-49 years) married/in union using modern contraceptive		17.3	15.7	3.9	6.7	18.7	27.6	36.8
Households lived an area with MNCHW campaign	24,857	30.3	20.1	39.4	32.2	15.1	23.9	43.4
Households that received any MNCHW services		15.8	13.0	22.8	18.6	7.2	10.5	19.0
HHs received MNCHW services at health facility	3,873	32.2	51.8	59.9	22.7	40.4	33.7	10.6
Households with improved source of drinking water	24,857	56.8	53.2	49.9	54.0	65.2	65.9	55.5
Households with improved sanitation facility		46.8	39.3	33.8	34.3	56.2	49.4	69.3
Children (0-35 months) with safe stool disposal	12,075	52.5	27.0	63.2	69.5	43.5	37.2	58.8

Child health:

Penta3 coverage for children aged 12-23 months was 57 percent, similar rates to 2014 (52 percent) but an improvement from 49 percent in 2015. North West (29 percent) and North East (49 percent) continue to record low coverage below 50 percent since 2014. Penta3 coverage shows a gradual decrease in North Central from 55 percent in 2014 to 50 percent in 2018. Encouragingly, measles vaccination coverage improved across the zones and to 65 percent from 51 percent nationally in 2015. Still, one-third of eligible children do not receive any measles vaccine. Besides stand alone measles campaigns, it is also included in the MNCHW campaigns offered bi-annually but the distribution remains low; this shows that overall the models of distibution at the current scales are not fulfilling the needs in the country. It is important to note that immunisation data are prevalently based on mothers' (caregivers) recall, therefore poor measles immunisation coverage could be due to the time lapse between the MNCHW/measles campaign, if conducted, and survey data collection. Vitamin A supplementation coverage was 41 percent, similar rates to 2015 (42 percent), and so nearly 60 percent of the children do not receive adequate levels of supplementation and are at risk for vitamin A deficiency with its adverse health consequences. Only two states (Osun -87 percent and Jigawa -74 percent) had coverage above the UNICEF prescribed 70 percent threshold; this is a drop from 2015 and 2014 when five and seven states met the 70 percent target respectively. Younger children seem to be at greater risk of VAD, and so it is vital to continue monitoring the supplementation programme progresses. National coverage for deworming was 40 percent among children age 12-59 months and ranged from 26 percent in North West to 60 percent in South East. Coverage varied from as low as 8 percent in Sokoto and as high as 76 percent in Imo. Deworming coverage over 50 percent was reported in only ten states – Imo, Abia, Lagos, Jigawa, Anambra, Yobe, Osun, Ekiti, Oyo and Rivers, an improvement from 2015 when only six states – Abia, Anambra, Edo, Imo, Lagos, and Ogun met this target. These results are based on mother's recall and should thus be interpreted with caution but states with more concern should be supported to conduct the immunization, vitamin A supplementation and deworming services more often and widely particularly in the North East and North West of Nigeria, so to mirror the frequent polio campaigns conducted in these areas.

Only one quarter of the 15 percent children under 5 years who reported to have had diarrhoea in the two weeks preceding the survey were treated with ORS (26 percent) or Zinc (24 percent), a variation from the previous results in 2015 when more children received ORS (21 percent) than zinc tablets (6 percent) but with dispatities across states. Mothers and/or caregivers are probably getting more informed and taking up the zinc treatment regimen for diarrhea as recommended by the Federal Ministry of Health. More than half of children with diarrhoea were aged 6-23 months, while only 9 percent of children aged less than 6 months reported diarrhoea in the two weeks preceding the survey, implying that apprpopriate complementary feeding introduction – water, sanitation and food hygiene – is crucial at this delicate transition period and continued breastfeeding until age of 2 years is highly recommended.

Maternal New-born and Child Health Weeks (MNCHW):

The coverage of key inyerventions are the results of poor delivery infrastrucre, which includes the routine, campaign and community services. Only 30 percent of households surveyed lived in an area where a MNCHW campaign was conducted and more than 50 percent of these received some MNCHW services. Households located in the South West had the highest campaigns and chance of benefitting from MNCHW services than those located in South East (19 vs 7 percent). Only 32 percent received any MNCHW services at the health facility and nearly two-thirds of the MNCHW services were received in other public places such as markets, church/mosque, or schools. No MNCHW services were received in the houses reflecting the policy guidelines for MNCHW to be offered to the masses in public places and not at families' own houses. Considering all health indicators reviewed, MNCHW campaigns should be continued and improved to reach more women and children.

Malaria:

Ownership and utilization of mosquito nets for malaria prevention is still sub-optimal with only 62 percent ownership of at least one mosquito net and only 37 percent of children using the nets. In spite of high fever incidences in children (22 percent) and WHO recommendations for prompt diagnosis and treatment, merely 13 percent of children who were ill with fever had Rapid Diagnostic Testing (RDT); and only 41 percent of those with fever were given an anti-malarial treatment including 17 percent who received Artemisinin-combination therapies (ACTs), which should be the first line treatment for malaria.[4] Post distribution educational campaign should therefore be incorporated into future distribution campaigns to help increase net utilisation.

The coverage of intermittent preventive treatment of malaria in pregnancy (IPT) use during pregnancy is still very low and short of the National Strategic Plan recommendation of providing three or more doses of sulphadoxin pyrimethamine (SP)/Fansidar for early case management against the adverse consequences of malaria in all women at pregnancy. Only 9 percent of women aged 15-49 years who had a live birth during the two years preceding the survey took SP/Fansidar three or more times during ANC as recommended, a slight increase from 6 percent in 2015.

Conclusion:

The NNHS 2018 survey findings show mixed results, with a general improving trend in most indicators and a stagnation or deterioration in other indicators, but remain far below the national and international targets, albeit as variations continue to show in these indicators by geopolitical zones, states and age. Acute malnutrition remain at alert levels while chronic malnutrition as characterised by stunting remain the biggest burden at serious or high levels according to the WHO/UNICEF classification. Improving trends are observed in 1) immunization coverage for

[4]Far below the national target of at least 80 percent as specified in the National Malaria Strategic Plan.

measles and penta3, and in deworming; 2) public health indicators especially improved water and sanitation; 3) malaria prevention and treatment especially household availability of mosquito nets, prompt testing (RDT) and treatment of malaria with ACTs; 4) diarrhoea management especially treatment of diarrhea with ORS and Zinc; and 5) HIV program during ANC including offer, testing and results provision to pregnant women during ANC visit. Other public health (mosquito net utilization, Vitamin A supplementation, and appropriate child stool disposal), reproductive health (such as skilled birth attendance, ANC visit and care by skilled personnel) and IYCF indicators (such as breatfeeding breastfeeding initiation, minimum acceptable diet and consumption of iron-fortified or iron rich foods) have stagnated since 2014. However, use of modern contraceptives, antibiotic treatment of ARI, and minimum dietary diversity for the child have shown deterioration and should be of much concern. In the light of these results and other survey findings, policy and programme implementation should discourage a “one size fit all” approach and ensure specific focus by zone, state and age groups for specific interventions. In this regard, and in accordance with WHO/UNICEF recommendations for reducing malnutrition, against the background of limited resources in countries affected by malnutrition, the most cost-effective scenario should be to scale up a subset of the 10 sets of interventions in the highest-burden regions of the country.

Introduction

General Background

The Federal Republic of Nigeria is located in West Africa with a coast on the Gulf of Guinea and Atlantic Ocean to the south. It neighbours Benin to the West, Cameroon to the East, Chad to the North east, and Niger to the North.

From the Gulf of Guinea on the Atlantic Ocean, plateaus and plains constitute most of the country's geography with coastal swamps in the south to tropical forests, woodlands, grasslands in the central areas and semi-desert in the north.

Nigeria is administratively divided into 36 states and one federal capital territory (FCT). The country has a population of about 186 million people[5] spread across the 37 administrative units (Table 2), making it the most populous country in Africa. With more than 250 distinct groups it is also one of the world's most ethnically diverse countries. The three major groups are the Hausa and Fulani in the north, the Yoruba in the west, and the Igbo in the east. These are also the most spoken languages in the country in addition to English Creole (Pidgin English) in the major towns.

[5]Source: Projected Population 2015 based on 2006 census conducted by National Population Commission (NPopC)

Table 2: Estimated population by State

S.N	Survey Domain	Estimated Population (2018)
1	Abia	3,901,620
2	Adamawa	4,438,628
3	Akwa Ibom	5,737,270
4	Anambra	5,808,135
5	Bauchi	6,844,061
6	Bayelsa	2,386,468
7	Benue	5,963,222
8	Borno	6,075,319
9	Cross River	4,047,549
10	Delta	5,894,432
11	Ebonyi	3,018,625
12	Edo	4,430,739
13	Ekiti	3,399,258
14	Enugu	4,603,666
15	FCT	3,388,685
16	Gombe	3,385,421
17	Imo	5,659,293
18	Jigawa	6,092,620
19	Kaduna	8,574,109
20	Kano	13,614,055
21	Katsina	8,186,877
22	Kebbi	4,617,431
23	Kogi	4,633,614
24	Kwara	3,351,153
25	Lagos	12,963,543
26	Nasarawa	2,633,439
27	Niger	5,781,235
28	Ogun	5,408,808
29	Ondo	4,863,334
30	Osun	4,923,834
31	Oyo	8,183,356
32	Plateau	4,376,193
33	Rivers	7,588,893
34	Sokoto	5,225,113
35	Taraba	3,195,042
36	Yobe	3,427,364
37	Zamfara	4,688,411
	Total	**201,310,816**

The 37 Nigerian states have been grouped into six geo-political zones[6] (Table 3). The zones will form another level of aggregated domain for the NNHS 2018 survey (Fig 1).

Table 3: Nigerian states by geo-political zone

Geo -political zone	State
South East	Anambra, Enugu, Ebonyi, Imo and Abia
South South	Edo, Delta, Rivers, Bayelsa, Cross-River and Akwa-Ibom
South West	Lagos, Ogun, Oyo, Osun, Ondo and Ekiti
North Central	Kwara, Kogi, Plateau, Nassarawa, Benue, Niger and F.C.T
North East	Taraba, Adamawa, Borno, Yobe, Bauchi and Gombe
North West	Sokoto, Zamfara, Kebbi, Kaduna, Katsina, Kano and Jigawa

The nutrition situation is characterised by a double burden of malnutrition with about one third of the children underfive years stunted (more than half in the northwest) and a similar proportion of women overweight or obese. Nearly half of the women of reproductive age (48.5 percent) are also anaemic. Although acute malnutrition levels are below the critical levels with global acute malnutrition (GAM) rate of 7.2%[7], the case loads are high given the population of the country. Nigeria faces the challenges of insecurity/conflict in some parts, and food deficit, and is the largest importer of rice – one of the staple foods. Each year about [1] million Nigerian children die before their [5]th birthday[8]. Malnutrition contributes to nearly half of these deaths

[6]Nigeria has six geopolitical regions that reflect major ethnic, cultural, geographic, and political blocks. The six zonal structure was adopted in 1995 during the regime of president Babangida, following former vice-president, Alex Ekwueme's proposal. Nigerian economic, political and educational resources are often shared across the zones.
[7]Findings from NNHS 2015 survey Report.
[8]Nigeria Demographic and Health Survey 2013 Report

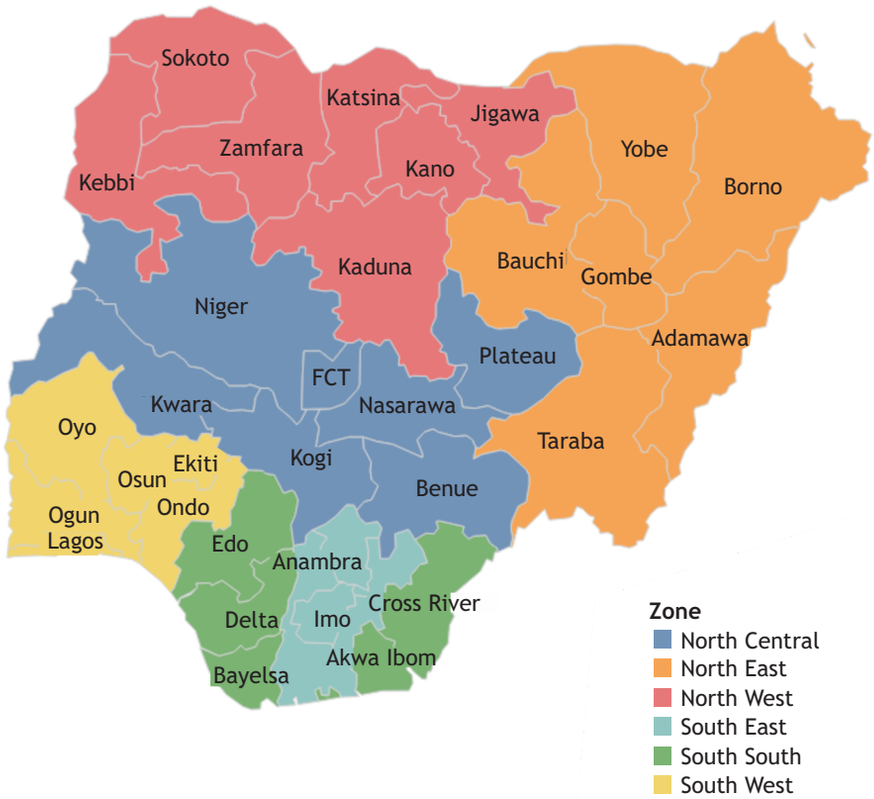

Figure 1: Map of Nigeria showing geopolitical zones and States/administrative units

Justification for the Survey

The National Strategic Plan of Action for Nutrition (NSPAN) 2014-2019, highlighted the need to strengthen the Nutrition Information System (NIS) in the country. Among others, conducting surveys on regular basis is one of the plans to achieve this objective. National Bureau of Statistics (NBS) and National Population Commission (NPopC) have been conducting surveys – including Multiple Indicator Cluster Survey (MICS) and Demographic Health Surveys (DHS) – every 4 to 5 years at national level. Though these surveys are useful, the frequency of these surveys does not helping to monitor the programs on regular/annual basis. Additionally, one of the key drivers of the National Nutrition and Health Survey is the Saving One Million Lives Programme for Results (SOML-PforR). In 2012, the Federal Government of Nigeria conceived SOML-PforR to address the unacceptably high maternal and child morbidity and mortality in Nigeria. By 2015, the programme was supported by a $500M credit from the World Bank, to save the lives of mothers and children by increasing access to, and utilisation of evidenced based, cost-effective and high impact maternal, child and nutrition interventions. It is based on an approach of structuring the flow of resources to pay for results rather than simply paying for processes or reimbursing activity costs. The programme objectives are based on the following intervention areas of (1) Immunization Coverage (Pentavalent-3) (2) Bed net use by children under five, (3) Vitamin A supplementation, (4) Family planning, (5) HIV testing during pregnancy and (6) Skilled birth attendance in terms of Quantity and Quality of Care. Hence, a sound data collection system that can generate reliable information on annual basis was adopted. For this

reason, a cross-sectional National Nutrition and Health Survey (NNHS) was proposed to be conducted on annual basis.

This is the third annual survey aimed to provide reliable information for planning and monitoring of key indicators at national level, the first and second having been conducted in 2014 and 2015 respectively. The gathered information will be used to triangulate with other information such as program data for improved program management in the country. Additionally, the results from this survey can be used to monitor the progress towards national goals and global commitments at state, region and national level.

Objectives of the Survey

The objectives of the survey are to:

- Determine the prevalence of acute malnutrition among children 6 to 59 months of age using WHZ, MUAC and bilateral oedema,
- Determine the prevalence of wasting, chronic malnutrition, underweight and overweight among children 6 to 59 months of age,
- Determine the prevalence of acute malnutrition among women 15 to 49 years of age using MUAC,
- Assess the 14-day retrospective prevalence of diarrhoea and use of ORS and zinc among children under-five years two weeks preceding the survey,
- Estimate coverage of vitamin A supplementation and deworming among children 6 to 59 and 12 to 59 months of age respectively within the last six months,
- Determine the coverage of DPT3/Penta3 and measles immunization among children 12-23 months of age,
- Determine the proportion of under five children with Acute Respiratory Infection (ARI) symptoms and proportion of children with fever received treatment,
- Determine the ownership and universal access of mosquito nets, and utilization of mosquito nets by children 0-59 months,
- To assess levels of Infant and Young Child (IYCF) practices among mothers/primary caregivers of 0-23 months old children,
- Assess the practice of skilled birth attendants, contraceptive prevalence rate and antenatal care coverage among women 15 to 49 years,
- Determine the proportion of women 15–49 years received HIV testing and intermittent preventive treatment during antenatal care, and
- Determine the proportion of households reached by MNCHW in the last six months and its mode of delivery.
- Monitor progress of key SOML-PforR indicators which will trigger disbursement of funds to the states

Methodology

Design

The National Nutrition and Health Survey using SMART methods is designed as a cross-sectional household survey using a two stage cluster sampling to provide results representative at the state level in 37 domains, which are also used by MICs and DHS, and thus allows for comparison of results.

Sampling

The sample for the 2018 NNHS is nationally representative and covers the entire population residing in non-institutional dwelling units in the country. The survey uses the national sample frame, which is a list of Enumeration Areas (EAs) prepared for the 2006 Population Census. Administratively Nigeria is divided into states, Local Government Areas (LGAs), and localities. In addition to these administrative units, during the 2006 population census, each locality was subdivided into census Enumeration Areas (EAs). The primary sampling unit (PSU), referred to as a cluster in this survey, is defined on the basis of EAs from the 2006 EA census frame. The 2018 NNHS sample has been selected using a two-stage cluster design as described below.

First stage sampling procedure: cluster selection

The PSU (clusters) for each state were randomly selected from the national master sample frame updated from a pre-survey household listing exercise according to the probability proportional to size (PPS) method with the support from National Population Commission.

Second stage sampling procedure: household selection

The second stage of sampling consisted of selecting households within each cluster by using systematic random selection. Where household listing was not completed prior to the survey, the team leader was responsible for the determination of the total number of households in the EA by conducting a household listing exercise through detailed enumeration of the selected cluster with support from the community leader and the supervisor. This served as the sampling frame for the subsequent selection of 20 random households. The team leader then calculated the sampling interval by dividing the total number of households in the cluster by 20 - the number of households to be interviewed. A random number table was used to randomly select a start number, between 1 and the sampling interval, to identify the first household. The sampling interval was used to identify all subsequent households to be included in the survey.

Sample size determination

In order to be able to estimate most of the indicators with reasonable precision, the sample size was calculated using a prevalence of Global Acute Malnutrition (GAM), based on children age 6-59 months (Table 4). Indicators with narrow age bands; 0-23, 6-23 and 12-23 months have been estimated with reasonable precision for each state. However, indicators with narrower age group such as 0-5, 6-8, and 12-15 months and very low prevalence, such as treatment of children with ARI and Malaria, have been estimated at zonal level, by pooling the data from the survey domain within each zone.

Table 4: parameters and source used for sample size calculation (national)

Parameters	Estimation	Source
Prevalence of Global Acute Malnutrition (GAM)	7.2	NNHS 2015
Precision	3.0%	SMART guideline[9]
Design effect for WHZ	1.5	SMART guideline
Number of children to be included	**466**	
Average number of persons per household	4.4	NHS 2015
Percent of under five children in total population	18.0%	NNHS 2015
Percent of non-response households	8.0%	NNHS 2015
Number of Households to be included	**710**	

On average, 466 children from 710 households are required for anthropometric assessment from each state. And based on CARE guide for IYCF sampling[10], 50% of these are expected to be children of 0-23 months of age (n=233) to be assessed for their feeding practices.

Accounting for the workload for data collection, it was determined that one team could complete 20 households in one cluster per day. To achieve the planned number of households per domain, 36 clusters were assigned and 720 households selected for each state. Accordingly, a total of 1,332 clusters were selected for the survey with the target to interview 26,640 households across the country.

Data collection was completed and analysed from a total of 24,857 households (93.3 percent), 19,471 children under-five years of age (>100 percent required) and 24,985 women of reproductive age (93.8 percent of planned number).

[9]Estimated precision for GAM rates of 5-9.9%
[10]Infant and Young Child Feeding Practices: Collecting and Using Data: A Step-by Step Guide. Cooperative for Assistance and Relief Everywhere, Inc. (CARE). 2010.

Training

The survey training was conducted by the Survey Technical Team from the National Bureau of Statistics, National Population Council, and the Federal Ministry of Health with support from UNICEF SMART consultant. The training team had a one-day pre-survey training on the NNHS protocol and SMART methodology and to agree on the mode and standardized materials/presentations for the training.

The trainings started on the 19th of February 2018 and conducted in three staggered rounds of 6 days to March 13th. Each round of training had a maximum number of 36 participants. It has been found that limiting the number of participants greatly increases quality of trainings in Nigeria. The same trainers were used at each training round to ensure consistency. The trainings were given in three separate locations (Akwanga, Kano and Uyo) for ease of transport of interviewers and to facilitate distribution of enumerators based on knowledge of local language[11].

The training included the following:

- An overview of the survey and its objectives, as well as an introduction to SMART methods
- Interviewing techniques and general communication skills
- Segmentation and systematic random sampling/selection of households
- Consent forms and identification of individuals to measure or interview
- How to complete the questionnaires in ODK using the tablets
- Estimation of age in months and validation using the calendar of local events developed
- How to make anthropometric measurements (always in two persons per team)
- The standardization of anthropometric measures: Each measurer had to measure 10 children less than five years of age twice (height, weight and MUAC) to assess the accuracy and precision of measurement by enumerators. The results of the standardization test by measurers was produced immediately and used to determine if additional training and standardization is needed.
- The identification of severe acute malnutrition and bilateral oedema and how to refer children with SAM to the nearest health facility for treatment
- The data entry using tablets and other quality control forms – Cluster Control Forms (by Team Leader), Cluster Summary Forms (by Supervisor)

The specific training on tablets included testing for basic literacy and numeracy, testing capacity to enter data in the tablet; saving, editing and sending of finalized data; how to handle system crashes of the tablet and when the data entry form closes accidentally.

[11]The major local dialects for the regions are Yoruba, Hausa, Igbo and Pidgin.

Recruitment of Interviewers and Team Organization

The National Bureau of Statistics (NBS), the National Population Commission (NPopC), Federal Ministry of Health (FMOH) and UNICEF selected 125 persons to be involved in the survey. Of the 125 individuals, 116 constituted the survey teams and 9 individuals were assigned as standby to replace any interviewers who dropped out during the data collection period. Of the 116 individuals, 90 of them were assigned to 30 survey teams (3 individuals per team, of 1 team leader and 2 measurers), 11 supervisors, 1 national coordinator, 1 assistant national coordinator, 5 training coordinators, 2 technical coordinators and 6 regional coordinators. Figure 2 shows detailed structure of the survey teams.

Team candidates were selected based on their experience in surveys and language skills to facilitate interviews with the respondents in their native language as much as possible. English language fluency was also a requirement for all team members. A minimum of 2 enumerators per team had to be females and all survey staff were required to wear culturally appropriate clothes. In some parts of the country, it was decided that all the 3 survey team members were to be females in order gain easy access to households, especially in areas where men are not allowed to enter households to measure children and women. Survey teams were assigned to areas taking into account their local languages skills, measurement skills, interview techniques and other requirements. A list of survey teams is provided in annex 4.

Supervisors were in charge of a group of 2 to 4 teams and responsible for the daily organisation and supervision of teams' work. The regional coordinators provided support to supervisors based on need, which included daily activities support based on feedback received from survey coordinators. The teams comprised of experienced and senior staffs from National Bureau of Statistics, National Population Commission and Federal Ministry of Health. UNICEF also has provided technical support and supportive supervision and monitoring to the teams.

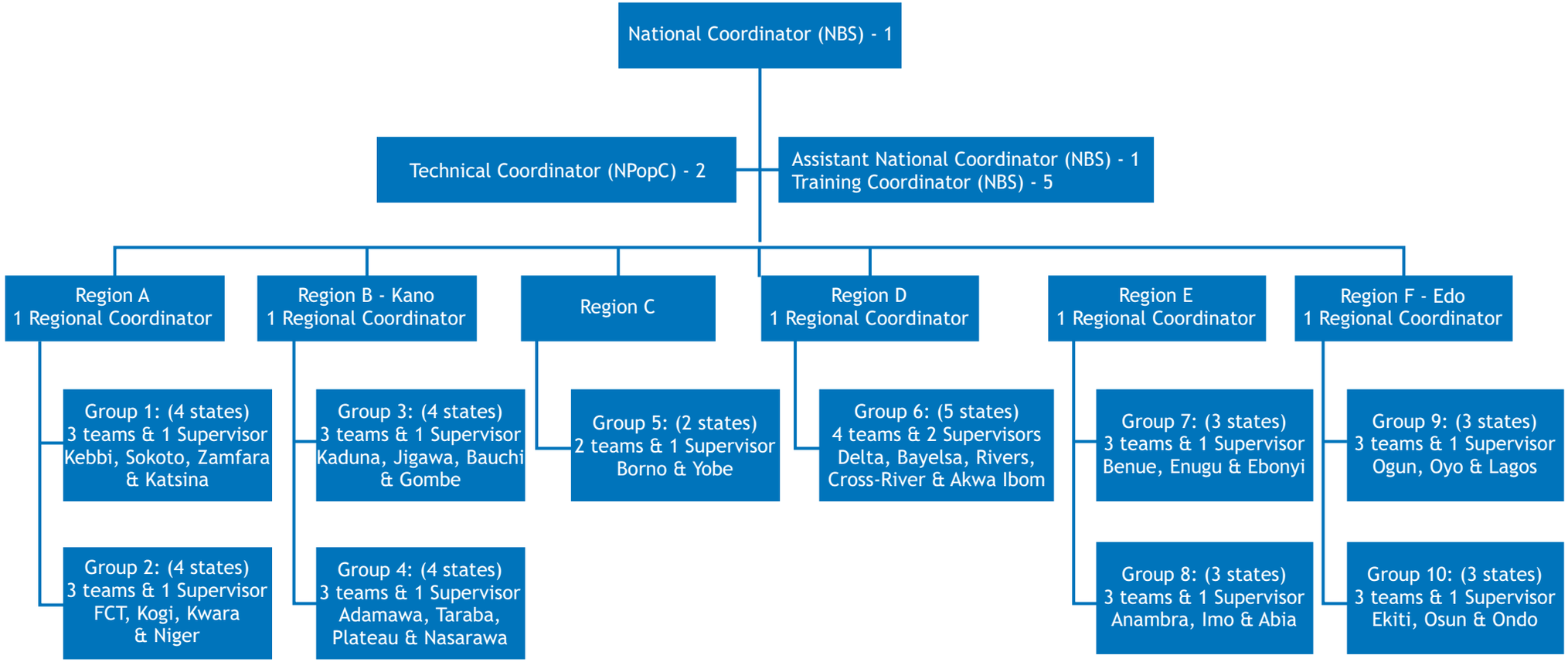

Figure 2: Structure of the survey team

A pilot test was conducted in villages/EAs that were near to the training venue and were not part of the clusters selected for the survey before the commencement of data collection, in order to assess the tools and evaluate the actual data collection process before deployment of the teams. In the Akwanga (Kini Country Hotel) training the pilot/field pre-test was conducted in Gbawo GSS – Kurmi Tagwaye and Islamic Primary School – Kurmi Tagwaye in Akwanga LGA, and Mico Farm Ubbe Nas, Egon LGA. In Kano training, the field pretest was conducted in Zawa Chiki in Kumbotso LGA and Kwankwaso in Madobi LGA. And in Uyo training, field pretest was conducted in EEMJM and Mr. Joseph in Uyo. The enumerators for the survey were assessed during the training with pre-and post-training tests and standardization tests and continually throughout the data collection period. Only those teams consistently producing high quality data were retained.

Data Collection and Supervision

Data collection was conducted for 11 cumulative weeks between February 26 and May 7, 2018 in 35 states and FCT that constitute the domains of the survey. Due to insecurity challenges, field data collection in Borno was planned and conducted in the last week of May. Fieldwork was undertaken with a minimum of 3 teams, except in Borno and Yobe, where only 2 teams were deployed[12]. A detailed state level fieldwork plan was designed, in order to visit the most remote selected enumeration areas first and avoid the missing of selected clusters due to inaccessibility from rain or impassable roads.

Galaxy tab 4 7.0" were used to collect data in the field. Collected data were automatically sent to a central server using 3G internet connection using FormHub (Open Data Kit) and immediately analysed in Emergency Nutrition Assessment (ENA) software for key quality checks. Results displayed on a purpose built dashboard and analysis in ENA and STATA served as the basis for communication between the coordinator and the rest of the survey teams during entire data collection period.

Prior to the start of the data collection phase, the selected local government area (LGA) authorities were informed about the survey in order to facilitate the informing of community members about data collection and to gain support from the officials and the community. Each team had its own vehicle and was accompanied by a driver. To minimise travel times and with support of the regional coordinators teams were advised to identify and stay in the nearest LGA to assess the following day. Survey teams started fieldwork in the same location where training was conducted in order to make supervision of all teams by senior survey staff possible.

[12]The small number of teams per supervisor allowed the supervision teams to provide effective support by reviewing the skills and implementation of all data collection process during entire period.

Data Quality Control, Data Entry & Analysis

Data Quality Control

To ensure the quality of data, supportive supervision was provided for the teams at different level. The first level of supervision was provided by the team supervisors who were responsible for closely monitoring the work of the teams to ensure that all sampled households were visited and eligible children and women included. An important element of these supervisors was to facilitate logistics, organize the team movement within the state, reviewing listing of households, systematic selection of households and supporting in measurement and age estimation. The main aim of such support was needed to ensure strict adherence to the survey protocol and to uncover any deliberate distortion of household listing and selection of households, age estimation or omission of household members by interviewers so as to reduce their workload. Supervisors also observed the interview to ensure that the survey teams conducted the interviews as per the interview manual. These observations were reported in a Cluster Summary Form, completed by the supervisor for each Cluster they visited.

The second level of supervision consisted of regional coordinators and state level government officers visit to the field and regularly check teams on their work. Areas flagged for concern by the consultant's weekly data quality review feedback, strengths and weaknesses were discussed in review session with the teams.

A dashboard was created to summarize the submissions and quality report on daily basis during fieldwork to check the data that were sent using smart phone (tablets). The results in the dashboard focused on issues such as response rates, the age distribution of children, women and household members, the level of missing values for key indicators, time of data collection and quality of anthropometry measurements. Any problems that appeared from review of the dashboard were discussed with the appropriate teams and where necessary teams reshuffled in order to prevent data quality problems from affecting the survey results.

Data Entry

Data were collected using tablets. Therefore, data collection and data entry were completed at the same time in the field. This has facilitated quick review with the objective to improve the quality of data and real time reporting of the results. In addition to saving the time of data entry, this method saved money that would have been spent on second data entry and validation process.

Data Analysis

Anthropometric data was analysed in ENA for SMART application to generate nutrition indicators to and to assess the quality of anthropometric measurements. All other data were analysed with STATA version 14.0. As per SMART methods, SMART flags were used in the analysis of child anthropometric data and extreme values that resulted likely from incorrect measurements at state level were excluded. SMART flags exclude anthropometric indices with -3 to 3 for WHZ, -3 to 3 for HAZ, -3 to 3 for WAZ, from observed mean. This is different from WHO flags which uses reference population and excludes -5 to 5 for WHZ, -6 to 6 for HAZ, -6 to 5 for WAZ. However, the regional and national level estimates were calculated using WHO exclusion criteria. This allows comparison to MICS and DHS survey results. Estimates on child malnutrition were calculated with the WHO 2006 growth reference standard.

Survey weights were calculated based on populations provided from the master sample frame and number of valid cases. The strata level results were self-weighted as per the sample design. The national results were weighted by the survey weights. Three sets of survey weights were used for household, woman level, and child level results, respectively. The data quality report is included in the annex 1.

Results

Sample Description

A representative sample of 24,857 households across 37 strata/domains selected participated in the survey. Target groups were children below 5 years of age and women in the reproductive age group (15-49 years). Overall 24,985 women were interviewed and 19,471 children aged 0-59 months were assessed for anthropometry and health status. Of these 9790 (50.3 percent) were boys and 9681 (49.7 percent) were girls (sex ratio of 1.0). Of the children aged 0-59 months surveyed, 8,124 were aged 0-23 months and were assessed for feeding practices.

Table 7, summarises the distribution of the samples for the different survey subgroups by geopolitical zones and states/survey domains. The national average size of household for the sample was 4.7, with mean number of children aged under five years as 0.9 and mean number of women in the reproductive age (15-49 years) as 1.0 (Table 5).

The sample sizes were representative at the state level and thus the results generated at the state level are valid and true reflection of the situation at respective states. However, the zonal and national results were weighted to provide results represtative to the respective aggregated levels.

Table 5: Number of households interviewed, children in completed sample and average number of children per household by survey domain

Background Characteristics	Total HHs	Total 0-59 Months	Sex Ratio	Total 0-23Months	Women (15-49 Yrs)	Mean HH Size	Mean U5s/HH	Mean Women/HH	% HHs/ Response
National	24,857	19,471	1.01	8,124	24,985	4.7	0.9	1.0	93.3
Zone									
North Central	4,486	3,636	0.99	1,526	4,986	5.1	0.9	1.1	89.0
North East	4,022	4.274	1.02	1,781	4,647	5.7	1.2	1.2	93.1
North West	4,767	5,815	1.02	2,535	5,969	6.1	1.3	1.3	94.6
South East	3,363	1,643	1.01	651	2,800	3.7	0.6	0.8	93.4
South South	4,093	2,187	0.99	859	3,459	3.7	0.6	0.9	94.7
South West	4,126	1,916	1.02	772	3,124	3.5	0.6	0.8	95.5
State									
Abia	654	312	1.14	126	517	3.6	0.6	0.8	90.8
Adamawa	671	596	1.05	275	793	5.4	1	1.2	93.2
Akwa-Ibom	704	392	0.94	158	609	4.0	0.6	0.9	97.8
Anambra	668	348	0.96	143	569	3.7	0.6	0.8	92.8
Bauchi	693	903	1.01	359	863	6.2	1.4	1.2	96.3
Bayelsa	676	355	1.06	134	511	3.5	0.6	0.8	93.9
Benue	623	529	0.96	211	692	5.1	0.9	1.1	86.5
Borno	683	638	1.07	269	698	5.4	1.0	1.1	94.9
Cross River	701	423	1.08	161	658	3.8	0.7	0.9	97.4
Delta	671	344	0.87	135	554	3.7	0.6	0.8	93.2
Ebonyi	689	395	0.97	154	656	4.2	0.7	1.1	95.7
Edo	645	333	1.11	135	501	3.7	0.6	0.8	89.6
Ekiti	688	306	0.82	129	462	3.2	0.5	0.7	95.6
Enugu	694	282	0.94	113	548	3.5	0.5	0.8	96.4
FCT	617	431	0.9	194	705	4.6	0.8	1.1	85.7
Gombe	683	812	1.13	335	813	6.0	1.3	1.2	94.9
Imo	658	306	1.05	115	510	3.7	0.6	0.8	91.4
Jigawa	681	909	1.05	414	842	6.5	1.5	1.2	94.6
Kaduna	618	589	0.99	246	795	5.7	1.1	1.3	85.8
Kano	669	838	0.98	343	839	6.2	1.3	1.3	92.9
Katsina	701	931	1.05	398	913	6.2	1.4	1.3	97.4
Kebbi	714	850	1.07	366	900	6.0	1.3	1.3	99.2
Kogi	623	368	1.06	156	599	4.3	0.7	1	86.5
Kwara	663	433	0.95	183	532	4.2	0.7	0.8	92.1
Lagos	696	333	1.18	145	613	3.6	0.6	0.9	96.7
Nasarawa	607	508	1.01	190	753	5.6	0.9	1.2	84.3
Niger	686	825	1.06	357	921	6.1	1.3	1.3	95.3
Ogun	703	394	1.01	150	573	3.7	0.7	0.8	97.6
Ondo	665	275	0.98	116	490	3.2	0.5	0.7	92.4
Osun	687	248	0.98	90.0	466	3.2	0.4	0.7	95.4
Oyo	687	360	0.96	142	520	3.6	0.6	0.8	95.4
Plateau	667	542	0.98	236	784	5.3	0.9	1.2	92.6
Rivers	696	340	1.01	136	626	3.7	0.6	0.9	96.7
Sokoto	692	833	1.08	347	820	5.6	1.3	1.2	96.1
Taraba	625	569	1.04	234	730	5.3	1.0	1.2	86.8
Yobe	667	756	0.86	309	750	5.8	1.3	1.1	92.6
Zamfara	692	865	0.96	421	860	6.0	1.3	1.2	96.1

Anthropometry Results

The anthropometric measurements of children in the survey were converted into z-scores using the World Health Organization Child Growth Standards (WHO, 2006)[13]. The use of the WHO Child Growth Standards is based on the finding that well-nourished children of all population groups for which data exist follow similar growth patterns before puberty. Therefore, the international standard population serves as a point of comparison, facilitating the examination of differences in the anthropometric status of subgroups in a population and of changes in nutritional status over time. The anthropometric indices are expressed as Z-scores derived from reference population and calculated with ENA software.

Four child malnutrition indicators are presented: Acute Malnutrition; Underweight; Stunting; and Overweight. Acute Malnutrition has been calculated using either Weight-for-height and/or bilateral oedema presence or mid upper arm circumference (MUAC) and/or bilateral oedema presence. The estimates for Underweight, Stunting, and Overweight were calculated for children 0 to 59 month; while the estimates for Acute Malnutrition are based on children aged 6 to 59 months.

SMART flags were used for state estimates to exclude implausible values that were resulted likely from incorrect measurements. SMART flags exclude anthropometric indices with <-3 to >3 from the observed mean for WHZ, HAZ and WAZ. WHO flags were used for national and regional estimates. These are based on the distribution of values in the reference population using the reference mean of zero and excludes <-5 to >5 for WHZ, <-6 to >6 for HAZ, <-6 to >5 for WAZ.

Acute Malnutrition

Although there is no gold standard measure for acute malnutrition, Weight for Height (WHZ) or middle upper arm circumference (MUAC), in addition to bilateral pitting oedema presence are defined as measures of acute malnutrition by WHO/UNICEF Statement 2009. While the WHZ based index is largely used as a nutritional or anthropometric index, the MUAC based index has a closer relation to infant and child mortality. Furthermore, children with oedema should always be classified as suffering from severe acute malnutrition (SAM), regardless of their MUAC and WHZ values.

[13]The indicators of the nutritional status of children are calculated using the growth standards published by the World Health Organization in 2006, which were generated through the data collected in the WHO Multicentre Growth Reference Study (WHO, 2006). That study, which sampled 8,440 children in six countries (Brazil, Ghana, India, Norway, Oman, and the United States), illustrated how children should grow under optimal conditions. Therefore, the WHO child growth standards can be used to assess children all over the world, regardless of ethnicity, social and economic influences, or feeding practices. The WHO growth standards replaced the previously used NCHS/CDC/WHO (U.S. National Center for Health Statistics/U.S. Centers for Disease Control and Prevention/World Health Organization) reference standards.

Acute malnutrition in children 6 to 59 months can be either moderate or severe. SAM is a very important indicator because it is the most dangerous form of malnutrition and it is closely linked to mortality risk. According to WHO and UNICEF Joint Statement[14], a child with severe acute malnutrition (WHZ <-3; and/or MUAC<115mm and/or bilateral oedema) has 9-fold increased risk of death compared to a child with no acute malnutrition.

Acute Malnutrition (WHZ /or Bilateral Oedema)

The national prevalence of Global Acute Malnutrition (GAM) defined as Weight-for-height Z scores (WHZ<-2 and/or oedema) rate for Nigeria among children aged 6-59 months was 7.0 percent (95% CI: 6.5-7.5). Moderate acute malnutrition (MAM) defined as WHZ≥-3 and ≤-2 was 5.5% (95% CI: 5.1-6.0) and the severe acute malnutrition (SAM) defined as WHZ<-3 and/or oedema rate was 1.5% (95% CI: 1.3-1.7). Twenty four oedema cases (0.1%) were observed during the assessment (Table 9). A higher proportion of boys (7.8%; 95%CI: 7.1-8.6) was more acutely malnourished than girls (6.1%; 95%CI: 5.5-6.7; p<0.05). The findings indicate a poor nutrition situation (GAM rate of 5-9.9%) according to WHO classification and are similar to the 2015 results when GAM and SAM rates were 7.2% (95% CI: 6.8-7.7) and 1.8% (95% CI: 1.6-2.1) respectively.

Figure 3 shows that the WHZ scores in the survey sample follows a normal distribution compared to the WHO (2006) reference population. The curve is slightly shifted to the left with mean z-score of -0.50 and standard deviation of 1.04, which indicates that the surveyed population's nutritional status is poorer as compared to the WHO reference population. The standard deviation is within acceptable range of 0.8 to 1.2. The design effect (DEFF) determined was 1.30 which shows homogeneity for WHZ distribution among the clusters, and below the DEFF of 1.5 used in the planning for sample size determination for this survey.

[14]WHO Child growth standards and the identification of severe acute malnutrition in infants and children, A Joint Statement, WHO and UNICEF, 2009.

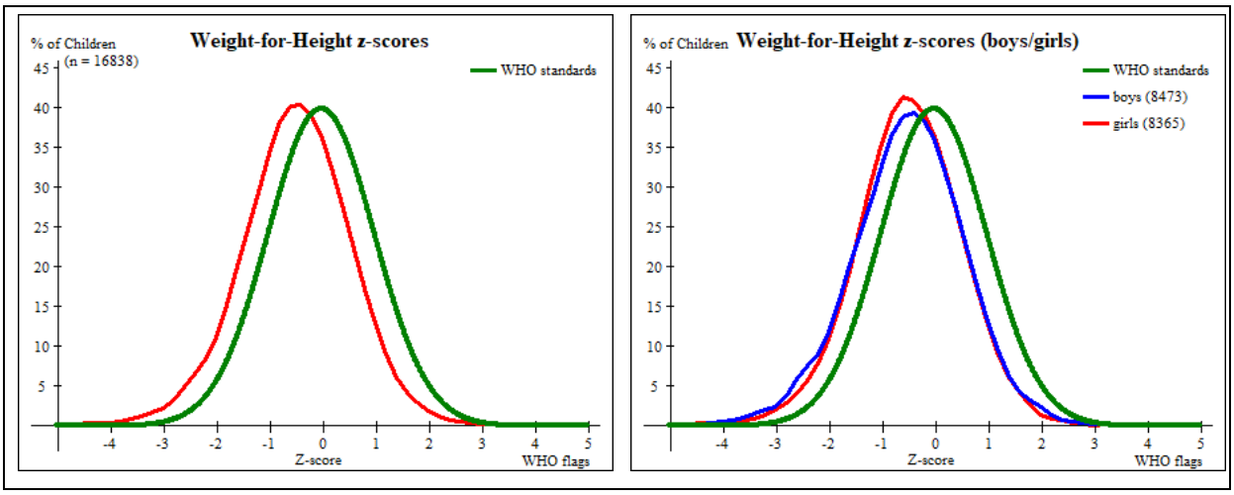

Figure 3: Distributions of Weight for Height z-scores (WHO 2006)[15]

When disaggregated by age group, the prevalence of global and severe acute malnutrition is highest in younger children – 14.8 and 3.4 percent among children 6 to 11 months and 10.3 and 2.4 percent among children 12 to 23 months respectively.

Disaggregation by geopolitical zones (Table 6) shows GAM rates below 10% and ranging from 4.9% in North Central to 8.7% in North East, and follow a similar pattern but with slight improvement from highest rates in the North West (10.2 percent) and North East (9.5 percent) in 2015.

Only Jigawa and Borno state still show serious warning acute malnutrition levels (GAM rate of above 10%). In Jigawa, GAM and SAM rates of 12.5 percent (95% CI: 10.2-15.2) and 1.6 percent (95% CI: 0.8-3.1) were reported respectively, with no significant change noted from the respective GAM and SAM rates of 11.9 and 1.7 recorded in 2015. In Borno the GAM and SAM rates are 10.6 percent (95% CI: 8.1-13.7) and 0.9 percent (95% CI: 0.3-2.3) respectively and similar to the GAM rate of 11.5 percent (95% CI: 8.8-14.9) but an improvement from the critical SAM rate of 2.6 percent (95% CI: 1.7-3.9) reported in 2015 NNHS.

The GAM rates for six states (Abia, Anambra, Bayelsa, Benue, Kogi and Taraba) were below the acceptable threshold of 5% while the rest had GAM rates in the alert/warning levels of 5-9.9%. Three states (Borno, Adamawa and Akwa Ibom) reported SAM rates at or above 2%, due to cases of oedema found. In total, 24 cases of bilateral oedema were reported: 4 in Benue, 3 each in Yobe, Ebonyi and Akwa Ibom, 2 each in Adamawa and Katsina and 1 each in Bauchi, Cross River, Jigawa, Kaduna, Kwara, Nasarawa, Sokoto and Zamfara. In 2015 five states (Borno, Jigawa, Katsina, Sokoto and Yobe) had rates above the warning threshold for GAM (10< GAM <15), 10 states had GAM in the 5-9.9% range and six states (Borno, Delta, Katsina, Kebbi, Sokoto and Yobe) were above the WHO SAM crisis threshold of 2 percent and a total of 51 oedema cases were found.

[15]Extreme values excluded using WHO flags for Zonal and National estimates and SMART Flags for state rates.

Overall, the GAM rates in most states remain at 5-9.9% levels, with a few states showing slight changes. There was decrease in GAM rates in Katsina, Kebbi, Cross River and Yobe; while increase in GAM rates were recorded in Rivers, Ondo, Plateau, Ebonyi, Akwa-ibom, Jigawa, Benue,Enugu and FCT.

In 2014, GAM and SAM were reported above critical cut off points (15 percent for GAM and 2 percent for SAM[16]) in three states, namely Jigawa, Bauchi, and Yobe. In 2015, none of the states surveyed reported such critical prevalence. However five states (Borno, Jigawa, Katsina, Sokoto and Yobe) were above the warning threshold for GAM (10< GAM <15) and six states (Borno, Delta, Katsina, Kebbi, Sokoto and Yobe) were above the WHO SAM crisis threshold of 2 percent. Only 10 states had GAM prevalence below the WHO acceptable threshold of 5 percent (Bayelsa, Benue, Ekiti, Enugu, FCT, Kogi, Nasarawa, Plateau and Rivers), however another 7 states had GAM below 5.5 percent in 2015. Finally, 51 cases of bilateral oedema were reported in 2015 NNHS: 6 in Kano, 5 in Kaduna and Zamfara, 4 in Jigawa and Bauchi, 3 in Adamawa, Gombe, Katsina and Kebbi, 2 in Delta, Nasarawa and Sokoto, 1 in Bayelsa, Borno, Imo, Kogi, Niger, Ondo, Plateau, Taraba and Yobe.

[16]EThe WHO classification of Malnutrition Prevalence considers GAM acceptable if < than 5%, precarious if comprised between 5 and 10%, serious if comprised between 10 and 15% and critical if above 15%. As for Chronic Malnutrition, acceptable prevalence should be < 20%, precarious comprised between 20 and 30%, serious between 30 and 40%, and critical above 40%. Underweight threshold are respectively set at 10% (acceptable), 20% (precarious), 30% (serious) and above 30% (critical). SAM prevalence is considered critical if above 2%.

Table 6: Prevalence of global, moderate and severe acute malnutrition in children 6 to 59 months of age by background characteristics (WHO 2006)

Background Characteristics	Total N	Global Acute Malnutrition (WHZ <-2 and/or oedema)	Moderate Acute Malnutrition (WHZ <-2 >= -3, no oedema)	Severe Acute Malnutrition (WHZ<-3 and/or oedema)
National	16,862	7.0	5.5	1.5
		[6.5-7.5]	[5.1-6.0]	[1.3-1.7]
Sex				
Male	8,488	7.8	6.0	1.8
		[7.1-8.6]	[5.4-6.7]	[1.5-2.1]
Female	8,374	6.1	5.0	1.1
		[5.5-6.7]	[4.4-5.5]	[0.9-1.4]
Age group				
6-11 Months	2,039	14.8	11.4	3.4
		[12.1-16.7]	[9.7-13.0]	[2.5-4.3]
12-23 Months	3,840	10.3	7.9	2.4
		[9.1-11.4]	[6.9-8.9]	[1.8-3.0]
24-35 Months	3,821	4.8	4.0	0.9
		[4.0-5.7]	[3.2-3.5]	[0.6-1.2]
36-47 Months	3,738	3.5	2.9	0.6
		[2.8-4.2]	[2.3-3.5]	[0.3-0.9]
48-59 Months	3,424	4.9	4.0	0.9
		[4.1-5.8]	[3.3-4.8]	[0.5-1.3]
Geopolitical Zone				
North Central	3,096	4.9	3.9	1.1
		[4.1-5.8]	[3.1-4.6]	[0.7-1.4]
North East	3,673	8.7	6.8	1.9
		[7.7-9.7]	[5.9-7.7]	[1.6-2.7]
North West	4,628	8.3	6.4	2.0
		[7.4-9.2]	[5.6-7.2]	[1.6-2.4]
South East	1,414	5.6	4.7	0.8
		[4.2-6.9]	[3.5-6.0]	[0.4-1.3]
South South	1,927	6.7	5.2	1.5
		[5.2-8.2]	[3.9-6.5]	[0.9-2.0]
South West	1,682	6.8	5.5	1.3
		[5.4-8.2]	[4.2-6.8]	[0.7-1.9]
State				
Abia	263	4.9	4.6	0.4
		[2.4-10.0]	[2.1-9.7]	[0.0-2.9]
Adamawa	493	7.1	4.9	2.2
		[4.8-10.4]	[3.1-7.6]	[1.1-2.5]

Table 6: continued

Background Characteristics	Total N	Global Acute Malnutrition (WHZ <-2 and/or oedema)	Moderate Acute Malnutrition (WHZ <-2 >= -3, no oedema)	Severe Acute Malnutrition (WHZ<-3 and/or oedema)
Akwa-Ibom	349	8.0	6.0	2.0
		[4.8-13.1]	[3.3-10.7]	[1.0-4.1]
Anambra	302	4.0	4.0	0
		[2.2-6.9]	[2.2-6.9]	[0.0-0.0]
Bauchi	785	9.4	8.2	1.3
		[7.7-11.4]	[6.5-10.1]	[0.7-2.4]
Bayelsa	309	4.5	2.9	0.6
		[2.9-7.0]	[2.3-6.4]	[0.2-2.6]
Benue	446	3.8	2.9	0.9
		[2.3-6.2]	[1.6-5.4]	[0.3-2.3]
Borno	557	10.6	9.7	0.9
		[8.1-13.7]	[7.2-13.0]	[0.3-2.3]
Cross River	377	5.0	4.0	1.1
		[2.6-9.4]	[1.9-8.0]	[0.4-2.7]
Delta	295	7.5	6.1	1.4
		[4.7-11.6]	[3.7-9.8]	[0.5-3.6]
Ebonyi	336	7.1	6.0	1.2
		[4.7-10.6]	[3.7-9.3]	[0.5-3.1]
Edo	288	5.2	4.9	0.3
		[3.0-8.8]	[2.8-8.2]	[0.0-2.6]
Ekiti	265	5.3	4.5	0.8
		[3.2-8.7]	[2.7-7.6]	[0.2-3.0]
Enugu	238	5.5	5.0	0.4
		[2.9-10.2]	[2.6-9.6]	[0.1-3.0]
FCT	347	5.5	4.3	1.2
		[2.8-10.3]	[2.2-8.4]	[0.4-3.7]
Gombe	671	7.6	6.6	1.0
		[5.4-10.6]	[4.5-9.4]	[0.5-2.4]
Imo	264	5.7	4.9	0.8
		[3.3-9.7]	[2.6-9.0]	[0.2-3.1]
Jigawa	754	12.5	10.9	1.6
		[10.2-15.2]	[8.8-13.3]	[0.0-3.1]
Kaduna	503	6.4	5.4	1.0
		[4.5-8.9]	[3.7-7.8]	[0.4-3.3]
Kano	710	6.8	5.6	1.1
		[5.0-9.1]	[4.0-7.8]	[0.6-2.3]
Katsina	824	5.7	4.7	1.0
		[4.1-7.9]	[3.4-6.6]	[0.4-2.2]
Kebbi	740	7.4	6.4	1.1
		[5.3-10.3]	[4.5-8.9]	[0.6-2.1]

Table 6: continued

Background Characteristics	Total N	Global Acute Malnutrition (WHZ <-2 and/or oedema)	Moderate Acute Malnutrition (WHZ <-2 >= -3, no oedema)	Severe Acute Malnutrition (WHZ<-3 and/or oedema)
Kogi	314	2.2	2.2	0
		[1.0-5.0]	[1.0-5.0]	[0.0-0.0]
Kwara	371	4.3	3.2	1.1
		[2.6-7.0]	[1.9-5.5]	[0.4-2.1]
Lagos	286	5.9	4.9	1.0
		[3.4-10.3]	[2.7-8.9]	[0.3-3.3]
Nasarawa	428	5.1	4.7	0.5
		[3.2-8.1]	[2.8-7.6]	[0.1-1.9]
Niger	703	5.4	5.1	0.3
		[4.0-7.3]	[3.8-6.9]	[0.1-1.2]
Ogun	349	6.6	5.4	1.1
		[4.4-9.8]	[3.6-8.1]	[0.4-2.9]
Ondo	233	8.6	7.7	0.9
		[5.1-14.1]	[4.6-12.6]	[0.2-3.5]
Osun	221	7.2	6.3	0.9
		[4.2-12.1]	[3.7-10.7]	[0.2-3.6]
Oyo	318	5.7	5.3	0.3
		[3.4-9.6]	[3.1-8.9]	[0.0-2.5]
Plateau	462	5.8	5.2	0.6
		[4.0-8.4]	[3.5-7.7]	[0.2-1.9]
Rivers	295	6.1	5.4	0.7
		[3.4-10.7]	[2.8-10.1]	[0.2-2.9]
Sokoto	725	9.8	8.8	1.0
		[7.7-12.3]	[6.8-11.4]	[0.5-1.9]
Taraba	480	4.2	4.0	0.2
		[2.6-6.7]	[2.3-6.6]	[0.0-1.5]
Yobe	650	8.9	7.1	1.8
		[7.0-11.3]	[5.4-9.3]	[1.0-3.3]
Zamfara	761	7.1	5.5	1.6
		[5.3-9.4]	[3.7-8.1]	[0.8-3.0]

Acute Malnutrition using Mid Upper Arm Circumference (MUAC /or Bilateral Oedema)

Low middle-upper arm circumference (in combination with bilateral oedema presence) is increasingly used to define severe acute malnutrition in management of SAM programming. MUAC is preferred in screening of malnourished cases to WHZ for its simplicity. MUAC strips are easier to carry than scales and easier to use for measuring children. Some limitations with MUAC measures in surveys are the following. There is no standard tension applied on the MUAC strip during measurement. Even with well-trained anthropometrists, there can be up to 1cm of variation in the measure of MUAC on the same child. Also MUAC measures for children are not standardised yet for age or sex, thus ignoring sex and age related changes. Boys and girls have a different growth, and at any time, and girls on average will have slightly lower MUAC than boys, even if well nourished[17]. For this reason, MUAC tends to diagnose more girls and younger children as acutely malnourished[18].

According to WHO and UNHCR standards, a MUAC measure of less than 115 mm and/or presence of oedema is defined as severe acute malnutrition and MUAC less than 125 mm is defined as acute malnutrition (severe and moderate) in children from 6 to 59 months.

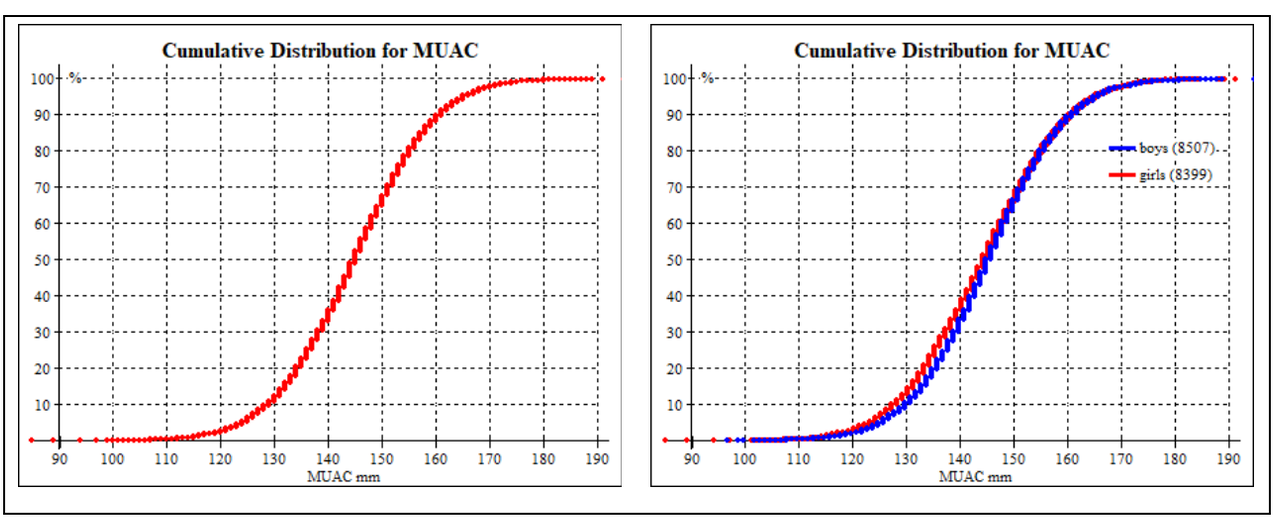

Figure 4: Distributions of MUAC among children 6-59 months

The prevalence of MUAC-based Acute Malnutrition is shown in Table 7. Overall GAM prevalence by MUAC (MUAC<125 mm/oedema) for children 6-59 months was 4.7 percent (95% CI: 4.3-5.1), with moderate acute malnutrition (MUAC>=115 and <125 mm) rate of 3.7% (95% CI: 3.4-4.1) and severe acute malnutrition (MUAC<115 mm/oedema) rate of 1.0% (95% CI: 0.8-1.1). Fig. 5 shows a sigmoid curve for normally distributed MUAC measurements with a mean MUAC of 144.7 mm (± 12.7 mm).

[17]EArm Circumference for Age, WHO Child Growth Standards, WHO 2007.
[18]Test characteristics of MUAC, University of Gent, 2012.

The rate of acute malnutrition based on MUAC was highest in North East (5.8 percent) and North West (5.7 percent) but lowest in South East Zone (2.9 percent). Disaggregation by age and sex confirms what was previously highlighted: the prevalence of acute malnutrition is highest in infants (6-11 months) and younger children – children less than 24 months than older children, and girls are more likely to be malnourished than boys 5.5 versus 3.9 percent (Table 10).

The highest prevalence of global acute malnutrition based on MUAC was reported in Zamfara (10.3%), followed by Katsina (9.2%), Jigawa (8.5%) and Sokoto (8.4%) in that order, while the lowest was recorded in Imo (0.8%), followed by Anambra (1.3%), Edo (1.7%), Bayelsa (1.9%) and Delta (2%), also recording zero percent severe acute malnutrition with very little variability. Kaduna (2.4%), Jigawa (2.1%), Katsina, Sokoto and Yobe (2%) reported the highest SAM rates by MUAC.

Table 7: Prevalence of acute malnutrition according to MUAC in children 6 to 59 months by background characteristics (WHO 2006)

Background Characteristics	Total N	Global Acute Malnutrition (MUAC<125 mm and/or oedema)	Moderate Acute Malnutrition (MUAC <125 and >= 115 mm), no oedema)	Severe Acute Malnutrition (MUAC<115 mm and/or oedema)
National	16,906	4.7	3.7	1.0
		[4.3-5.1]	[3.4-4.1]	[0.8-1.1]
Sex				
Male	8,507	3.9	3.0	0.9
		[3.4-4.4]	[2.5-3.4]	[0.7-1.2]
Female	8,399	5.5	4.5	1
		[4.9-6.1]	[4.0-5.0]	[0.8-1.2]
Age group				
6-11 Months	2,046	15.6	12.3	3.4
		[13.7-17.6]	[10.6-14.0]	[2.5-4.2]
12-23 Months	3,855	8.2	6.6	1.6
		[7.2-9.3]	[5.6-7.5]	[1.2-2.1]
24-35 Months	3,832	2.4	1.9	0.5
		[1.9-2.9]	[1.5-2.4]	[0.3-0.7]
36-47 Months	3,744	1.2	0.9	0.3
		[0.8-1.5]	[0.6-1.2]	[0.0-0.5]
48-59 Months	3,429	0.7	0.6	0.2
		[0.4-1.0]	[0.3-0.8]	[0.0-0.3]
Geopolitical Zone				
North Central	3,107	4.5	3.5	1.0
		[3.6-5.4]	[2.8-4.3]	[0.6-1.4]
North East	3,124	5.8	4.3	1.5
		[4.9-6.8]	[3.6-5.1]	[1.1-2.0]
North West	3,684	5.7	4.3	1.4
		[4.8-6.6]	[3.6-5.0]	[1.0-1.8]
South East	1,417	2.9	2.6	0.3
		[2.0-3.9]	[1.7-3.6]	[0.1-0.5]
South South	1,934	3.1	2.6	0.5
		[2.3-4.0]	[1.8-3.4]	[0.2-0.9]
South West	1,685	3.6	3.1	0.5
		[2.6-4.5]	[2.2-3.9]	[0.1-0.8]
State				
Abia	266	2.6	2.3	0.4
		[1.3-5.4]	[1.0-5.0]	[0.1-2.8]
Adamawa	495	5.0	3.4	1.6
		[2.9-8.6]	[1.9-6.0]	[0.7-3.6]
Akwa-Ibom	353	7.1	5.4	1.7
		[5.0-10.0]	[3.7-7.9]	[0.8-3.8]
Anambra	3.4	1.3	1.3	0
		[0.5-3.3]	[0.5-3.3]	[0.0-0.0]
Bauchi	794	7.6	5.9	1.6
		[5.9-9.7]	[4.5-7.8]	[1.0-2.7]

Table 7: continued

Background Characteristics	Total N	Global Acute Malnutrition (MUAC<125 mm and/or oedema)	Moderate Acute Malnutrition (MUAC <125 and >= 115 mm), no oedema)	Severe Acute Malnutrition (MUAC<115 mm and/or oedema)
Bayelsa	312	1.9	1.9	0
		[0.8-4.7]	[0.8-4.7]	[0.0-0.0]
Benue	456	2.6	1.5	1.1
		[1.5-4.6]	[0.6-3.7]	[0.5-2.5]
Borno	560	4.6	3.9	0.7
		[30-7.2]	[2.5-6.2]	[0.3-19]
Cross River	381	2.1	1.6	0.5
		[1.0-4.3]	[0.6-3.9]	[0.1-2.1]
Delta	300	2	2	0
		[0.7-5.4]	[0.7-5.4]	[0.0-0.0]
Ebonyi	340	4.7	3.2	1.5
		[2.7-8.1]	[1.7-6.2]	[0.6-3.5]
Edo	288	1.7	1.4	0.3
		[0.6-4.7]	[0.5-3.6]	[0.0-2.5]
Ekiti	267	4.1	3	1.1
		[2.2-7.6]	[1.3-6.7]	[0.4-3.4]
Enugu	242	6.6	6.6	0
		[3.9-10.9]	[3.9-10.9]	[0.0-0.0]
FCT	354	4.2	3.4	0.8
		[2.1-8.3]	[1.7-6.8]	[0.3-2.6]
Gombe	690	4.5	3.2	1.3
		[2.8-7.0]	[2.0-5.1]	[0.5-3.2]
Imo	265	0.8	0.8	0
		[0.1-5.5]	[0.1-5.5]	[0.0-0.0]
Jigawa	766	8.5	6.4	2.1
		[5.9-12.1]	[4.3-9.3]	[1.1-4.0]
Kaduna	509	5.5	3.1	2.4
		[3.6-8.3]	[1.8-5.4]	[1.4-3.8]
Kano	715	3.6	2.9	0.7
		[2.2-5.8]	[1.8-4.8]	[0.3-1.6]
Katsina	830	9.2	7.1	2
		[6.6-12.5]	[5.1-9.8]	[1.2-3.5]
Kebbi	750	7.6	5.9	1.7
		[5.4-10.6]	[4.0-8.6]	[0.9-3.4]
Kogi	316	3.5	2.2	1.3
		[1.6-7.3]	[1.0-5.0]	[0.3-6.1]
Kwara	372	4.6	2.7	1.9
		[2.8-7.4]	[1.5-4.7]	[1.0-3.6]
Lagos	290	3.1	2.4	0.7
		[1.8-5.4]	[1.2-4.7]	[0.2-2.8]
Nasarawa	432	3.2	2.8	0.5
		[1.9-5.4]	[1.6-4.7]	[0.1-1.9]
Niger	710	6.3	5.9	0.4
		[4.4-9.0]	[4.1-8.4]	[0.1-1.3]

Table 7: continued

Background Characteristics	Total N	Global Acute Malnutrition (MUAC<125 mm and/or oedema)	Moderate Acute Malnutrition (MUAC <125 and >= 115 mm), no oedema)	Severe Acute Malnutrition (MUAC<115 mm and/or oedema)
Ogun	351	4.0	3.1	0.9
		[2.4-6.6]	[1.8-5.5]	[0.3-2.6]
Ondo	236	3.4	3.4	0
		[1.6-7.2]	[1.6-7.2]	[0.0-0.0]
Osun	223	6.3	5.8	0.4
		[3.5-11.1]	[3.2-10.4]	[0.1-3.3]
Oyo	318	2.2	2.2	0
		[1.1-4.4]	[1.1-4.4]	[0.0-0.0]
Plateau	467	6.6	5.6	1.1
		[4.5-9.6]	[3.8-8.2]	[0.5-2.4]
Rivers	299	2.7	2.3	0.3
		[1.2-5.7]	[1.0-5.4]	[0.0-2.5]
Sokoto	736	8.4	6.4	2.0
		[6.0-11.6]	[4.3-9.4]	[1.2-3.4]
Taraba	483	3.5	2.5	1.0
		[2.2-5.5]	[1.6-4.0]	[0.4-3.8]
Yobe	662	7.3	5.3	2.0
		[5.0-10.4]	[3.5-7.9]	[1.1-3.3]
Zamfara	773	10.3	8.5	1.8
		[7.6-14.0]	[6.2-11.6]	[1.0-3.3]

Although MUAC and WHZ identify a population of children that only partially overlap[19], findings from both indicators substantially converge and in general, malnutrition prevalence in the North West and North East is higher than in the South and North Central zones, and the difference is significant for both GAM and SAM.

Underweight

Underweight refers to low weight-for-age, that is, a child is too thin for his/her age. It is defined in terms of standard deviation from median weight-for-age of the reference WHO population. Children whose weight-for-age is below minus two standard deviations (-2 SD) from the reference population median are classified as underweight, while children whose weight-for-age is below minus three standard deviations (-3 SD) from the reference median are considered severely underweight. Growth charts based on Weight for Age Z scores (WAZ) reference curves are used for growth monitoring in Mother and Child Health programmes and for attainment of the Millennium Development Goals.
Figure 5 below shows that the distribution of WAZ in the sample follows a normal distribution, albeit shifted to the left (Mean WAZ= -1.23±1.13) indicating a poorer undernutrition compared to the reference population (WHO, 2006).

[19]While WHZ is a more comprehensive measure of nutritional status, MUAC is mainly a measure of muscle mass. Test characteristics of MUAC, University of Gent, 2012.

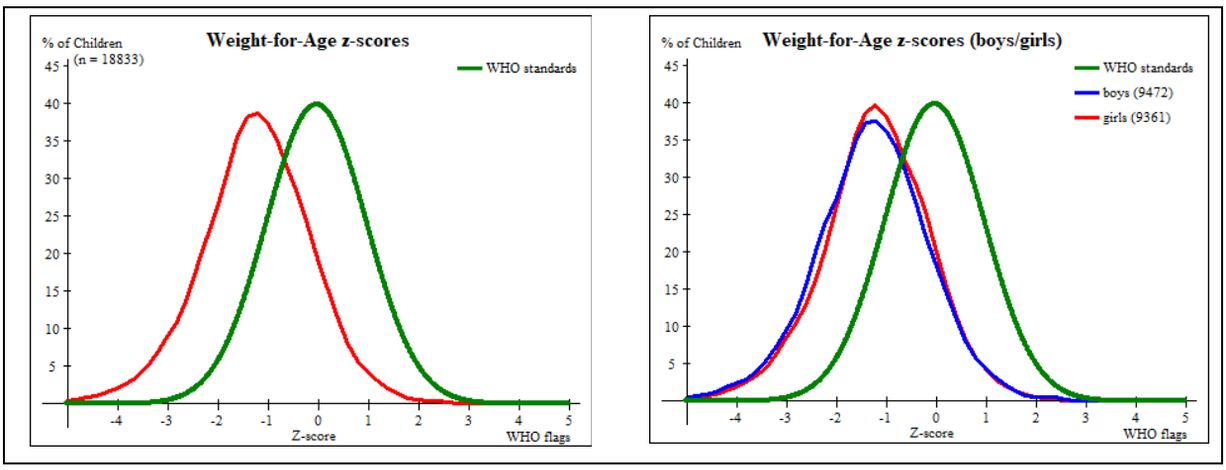

Figure 5: Distributions of Weight for Age z-score (WHO 2006)

The national prevalence of underweight among children (0-59 months) was 19.9 percent (95% CI: 19.0-20.8), indicating no change from the 19.4 percent (95% CI: 18.6-20.2) reported in 2015. The prevalence is higher than the global estimate of 15 percent[20], however lower or similar to the rates in the West and Central Africa region (22%), and the 2014 national level prevalence (21%) respectively.

When disaggregated by geo-political zones (Table 8), the results show underweight is highest in North West (29.7 percent), a drop to just below the 30 percent mark – the WHO critical threshold; and lowest in South East (12.6 percent). South East, South South (15.1 percent), South West (14.8 percent) as well as North Central (15.6 percent) have all shown increased levels from the respective 9.5, 12.3, 12.2, and 13.6 percent in 2015, though the changes are not statistically significant.

Five states (Yobe, Jigawa, Kebbi, Katsina and Sokoto) reported critical underweight rates above 30 percent (just like in 2015) with the highest rates reported in Yobe (37.1%; 95% CI: 32.0-42.4) followed by Jigawa (36.4%; 95% CI: 31.5-41.6). In 2015, Jigawa had the highest underweight rate of 40.6 percent (95% CI: 35.9-45.5). The lowest underweight rates (<10%) were reported in Anambra (6 percent) and Enugu (9.2 percent). Generally, there was increased rates of underweight in Abia, Ebony, Bayelsa, Benue, Delta, Ekiti, Enugu, Gombe, Ogun, Ondo, Plateau, Rivers and Yobe; underweight prevalence decreased in Jigawa, Kaduna, Sokoto and Taraba. The prevalence in eleven states – Bauchi, Borno, Gombe, Jigawa, Plateau, Kano, Katsina, Kebbi, Sokoto, Yobe and Zamfara – is greater than the national estimate of 22.4 percent, a result that corresponds with 2014 and 2015 findings.

As shown in Table 8, the proportion of underweight children is highest among those aged 6-23 months (at least 25 percent), and boys more likely to be underweight than girls (21.5 versus 18.3 percent).

[20]United Nations Children's Fund, World Health Organization. The World Bank, UNICEF-WHO-World Bank Joint Child Malnutrition Estimates, 2013

Table 8: Prevalence of overall, moderate and severe underweight status (Weight-for-Age Z-score) in children 0 to 59 months of age by background characteristics (WHO 2006)

Background Characteristics	Total N	Prevalence of Underweight (WAZ<-2)	Prevalence of Moderate Underweight (WAZ <-2 and >=-	Prevalence of Severe Underweight (WAZ<-3)
		%	%	%
National	18,859	19.9	14.8	5.1
		[19.0-20.8]	[14.1-15.5]	[4.6-5.5]
Sex				
Male	9,489	21.5	16.0	5.5
		[20.3-22.6]	[15.1-16.9]	[4.9-6.0]
Female	9,370	18.3	13.7	4.6
		[17.2-19.3]	[12.8-14.5]	[4.1-5.2]
Age group				
0-5 Months	1,941	16.8	11.9	4.9
		[14.8-18.9]	[10.1-13.7]	[3.8-6.0]
6-11 Months	2,051	26.5	18.2	8.3
		[24.1-28.9]	[16.2-20.2]	[6.9-9.7]
12-23 Months	3,858	25.0	17.5	7.6
		[23.3-26.7]	[16.1-18.8]	[6.6-8.5]
24-35 Months	3,835	19.0	14.2	4.7
		[17.4-20.5]	[13.0-15.5]	[4.0-5.5]
36-47 Months	3,745	16.1	13.0	3.1
		[14.7-17.6]	[11.7-14.3]	[2.5-3.7]
48-59 Months	3,431	17.0	14.1	2.9
		[15.5-18.5]	[12.7-15.5]	[2.2-3.5]
Geopolitical Zone				
North Central	3,490	15.6	12.0	3.6
		[13.9-17.2]	[10.8-13.3]	[2.8-4.4]
North East	4,134	25.5	18.2	7.3
		[23.6-27.4]	[16.8-19.7]	[6.2-8.3]
North West	5,663	29.7	21.3	8.5
		[28.0-31.4]	[20.0-22.6]	[7.5-9.4]
South East	1,593	12.6	10.5	2.1
		[10.6-14.6]	[8.8-12.2]	[1.3-3.0]
South South	2,137	15.1	11.7	3.3
		[13.3-16.8]	[10.2-13.2]	[2.4-4.3]
South West	1,842	14.8	11.4	3.4
		[12.7-16.9]	[9.6-13.2]	[2.6-4.3]
State				
Abia	288	17.4	12.2	5.2
		[13.0-22.8]	[8.7-16.7]	[3.1-8.7]
Adamawa	562	17.6	14.2	3.4
		[14.0-21.9]	[11.0-18.2]	[1.9-5.8]
Akwa-Ibom	381	19.2	13.9	5.2
		[15.3-23.7]	[10.4-18.4]	[3.4-8.1]

Table 8: Continued

Background Characteristics	Total N	Prevalence of Underweight (WAZ<-2)	Prevalence of Moderate Underweight (WAZ <-2 and >=-	Prevalence of Severe Underweight (WAZ<-3)
Anambra	336	6.0	6.0	0
		[3.6-9.6]	[3.6-9.6]	[0.0-0.0]
Bauchi	862	28.2	20.0	8.2
		[24.9-31.7]	[17.3-22.9]	[6.2-10.8]
Bayelsa	343	12.5	10.2	2.3
		[8.4-18.3]	[6.7-15.3]	[1.2-4.6]
Benue	509	13.6	11.0	2.6
		[10.8-16.9]	[8.6-13.9]	[1.4-4.5]
Borno	621	27.2	20.6	6.6
		[23.1-31.8]	[17.4-24.3]	[4.8-9.0]
Cross River	415	13.0	10.4	2.4
		[9.0-18.4]	[7.6-14.0]	[0.6-8.6]
Delta	331	15.1	12.7	2.4
		[11.5-19.7]	[9.4-17.0]	[1.1-5.4]
Ebonyi	388	20.4	16.2	4.1
		[16.3-25.2]	[12.7-20.5]	[2.4-7.0]
Edo	318	12.9	10.4	2.5
		[9.7-17.0]	[7.2-13.6]	[1.4-4.6]
Ekiti	290	13.1	9.7	3.4
		[9.7-17.5]	[6.7-13.8]	[1.8-6.5]
Enugu	272	9.2	8.8	0.4
		[6.0-13.9]	[5.6-13.5]	[0.1-2.6]
FCT	399	11.8	10.3	1.5
		[8.3-16.4]	[7.2-14.5]	[0.6-3.5]
Gombe	770	26.9	20.6	6.2
		[22.8-31.4]	[17.4-24.3]	[4.3-9.0]
Imo	295	13.9	12.5	1.4
		[10.0-19.0]	[8.8-17.6]	[0.4-4.6]
Jigawa	838	36.4	25.4	11.0
		[31.5-41.6]	[22.2-28.9]	[8.4-14.2]
Kaduna	555	22.2	16.8	5.4
		[18.0-27.0]	[13.3-20.9]	[3.9-7.5]
Kano	802	26.9	20.3	6.6
		[23.2-31.1]	[17.3-23.7]	[4.8-9.1]
Katsina	904	31.4	24.2	7.2
		[27.0-36.2	[21.0-27.8]	[5.0-10.2]
Kebbi	827	32.8	23.2	9.6
		[29.0-36.7]	[20.3-26.4]	[7.5-12.1]
Kogi	356	10.7	9.3	1.4
		[7.5-14.9]	[6.6-12.8]	[0.5-4.0]
Kwara	416	15.1	11.8	3.4
		[10.7-21.0]	[7.8-17.5]	[1.6-7.0]

Table 8: Continued

Background Characteristics	Total N	Prevalence of Underweight (WAZ<-2)	Prevalence of Moderate Underweight (WAZ <-2 and >=-	Prevalence of Severe Underweight (WAZ<-3)
Lagos	320	12.2	10.0	2.2
		[8.4-17.3]	[6.7-14.8]	[1.1-4.3]
Nasarawa	478	16.9	14.9	2.1
		[13.5-21.0]	[11.5-18.9]	[1.2-3.6]
Niger	784	16.2	13.0	3.2
		[12.8-20.3]	[10.3-16.4]	[2.1-4.9]
Ogun	372	20.4	15.6	4.8
		[16.1-25.6]	[12.1-19.9]	[2.9-8.0]
Ondo	258	19.8	14.0	5.8
		[13.5-28.0]	[9.1-20.8]	[3.4-9.8]
Osun	240	15.0	12.9	2.1
		[11.0-20.1]	[9.1-17.9]	[0.9-4.6]
Oyo	347	11	9.8	1.2
		[7.9-15.1]	[6.8-13.9]	[0.4-3.1]
Plateau	516	22.7	15.5	7.2
		[17.8-28.4]	[12.2-19.5]	[4.8-10.5]
Rivers	324	13.3	11.7	1.5
		[9.9-17.6]	[8.7-15.7]	[0.6-3.7]
Sokoto	812	30.3	22.4	7.9
		[26.4-34.5]	[19.7-25.4]	[5.8-10.7]
Taraba	532	10.5	8.5	2.1
		[7.2-15.2	[6.0-11.9]	[0.9-4.5]
Yobe	726	37.1	26.0	11.0
		[32.0-42.4]	[22.4-30.0]	[8.6-13.9]
Zamfara	849	29.2	21.8	7.4
		[25.9-32.8]	[18.9-24.9]	[5.4-10.1]

Stunting

Stunting, an indicator of chronic malnutrition, refers to linear growth retardation and cumulative growth deficits in children. It reflects the failure to grow in stature, which occurs as a result of inadequate nutrition over a longer period. For this reason, stunting – and especially stunting of children under five years of age – is a stronger indicator of hunger and endemic poverty than underweight[21].

Children whose height-for-age Z-score (HAZ) is below minus two standard deviations (-2 SD) from the median of the WHO reference population are considered stunted or chronically malnourished. Children who are below minus three standard deviations (-3 SD) from the reference median are considered severely stunted. Figure 6 shows a significant shift to the left from WHO reference curve, an indication of a remarkably poorer stunting levels in the country, with mean HAZ of -1.36 (±1.28).

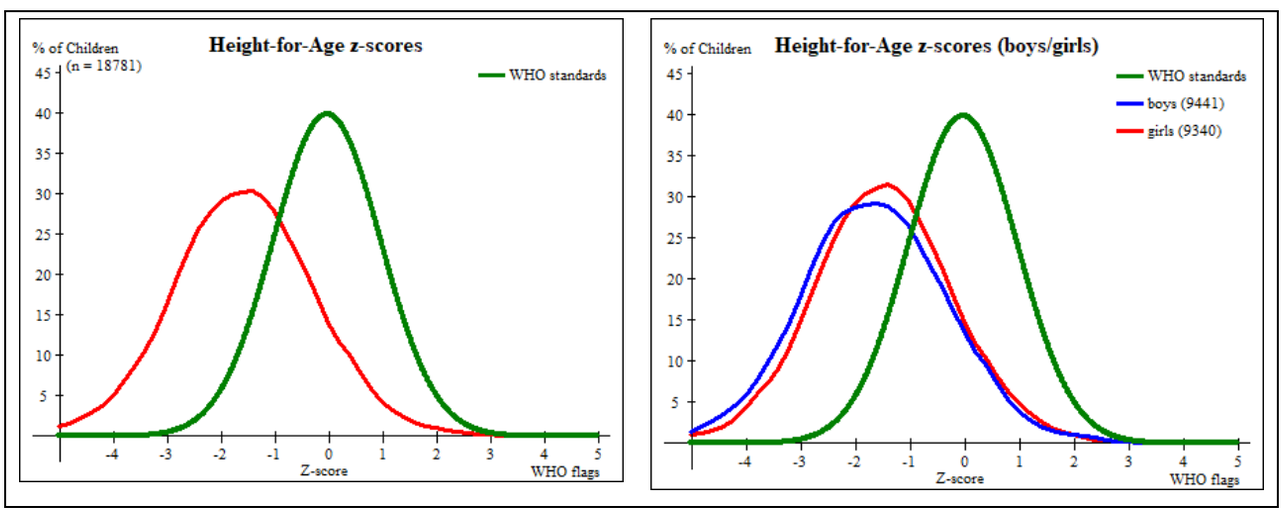

Figure 6: Distributions of Height for Age z-score

Although wasting and underweight are serious, the largest malnutrition burden for Sub-Saharan Africa is in fact stunting[22]: About 37 percent of children are stunted in sub-Saharan Africa compared to a global prevalence of 25 percent[23]. The WHO classification of malnutrition prevalence considers stunting serious (or high) if levels fall within 30 to 39.9 percent, and critical (or very high) if 40 percent and above. Moreover in 2012 the WHAR introduced a specific stunting target in order to complement MDGs underweight goal: a relative reduction of 40 percent in the number of stunted children to be achieved globally by the year 2025[24].

[21]The Nutrition Challenge in Sub-Saharan Africa, Regional Bureau for Africa, UNDP 2012.
[22]The Nutrition Challenge in Sub-Saharan Africa, Regional Bureau for Africa, UNDP 2012.
[23]The State of the World's Children 2015, UNICEF, based on MICS, DHS and other national surveys, 2009–2013.
[24]Proposed Global Targets for Maternal, Infants and Young Children Nutrition, WHO, 2012.

In 2015, the Global Nutrition Report 2015 placed Nigeria within the "off-course" countries that are achieving "some progress" in terms of stunting[25]. According to DHS, MICs and NNHS surveys, the nutritional status of Nigerian children gradually improved over the last decade, the stunting prevalence dropping from 41 percent in 2008 (DHS) to 36 percent in 2011 (MICS) to 32 percent in 2014 (NNHS) and 32.9 percent (95% CI: 31.9-34.0) in 2015.

The national stunting prevalence of 32.0 percent (95% CI: 30.7-33.4) falls within the WHO serious levels, and similar to the 2015 levels when stunting prevalence was 32.9 percent (95% CI: 31.9-34.0). The stunting rate is however, lower than the Sub-Saharan regional level of 37 percent. Nevertheless the situation is critical – above 40 percent – in the North West (52.1%) and North East (44.3%) states. The situation is particularly very serious in Katsina (58%), Zamfara (55.6%), Jigawa (54.1%), Sokoto (53.8%), Kebbi (51.8%), Kano (46.0%) and Kaduna (42.9%) in North West zone; and in Yobe (55.8%), Bauchi (45.6%) and Gombe (44.6%) in North West. In North Central, Plateau state recorded a high stunting rate of 42.8 percent.

The prevalence of stunting is lowest in the South East (17.2 percent), where the stunting rate is below the 20% threshold for poor chronic malnutrition. Overall, 10.8 percent (95% CI: 10.0-11.5) percent of children are severely stunted (below -3 SD), a slight decrease from the 12.5% (95 CI: 11.8-13.2).

As shown in Table 9, analysis by age groups shows that stunting increases with age, peaking at slightly above 35 percent among children in their second and third year of life. Severe stunting shows a similar pattern, with the highest proportion of severe stunting in children age 12-23 months (13.9 percent). Percentage of stunted children over 2 years of age is significantly higher ($p<0.001$) than for younger children, exhibiting the consequences of stunting in early age and of long-term malnutrition. Disaggregated by sex, boys (34.8 percent; 95% CI: 33.2-36.4) are more likely to be stunted than girls (29.2 percent; 95% CI: 27.7-30.6). Since underweight, wasting (WHZ based) and stunting indicators all report the same sex difference; this finding might reflect a yet not well understood greater vulnerability of boys at this stage, which may have higher nutritional requirements than girls[26]. The claim that boys are preferentially fed more than girls in many cultures is not true going by these findings[27] .

[25]To be classified as "on course", countries should have stunting rates under 5 percent and an actual average annual rate of reduction (AARR) greater than their country-specific AARR required to meet the global goal. Countries with stunting rates greater than or equal to 5 percent were classified in the "off-course" category. Off-course countries have been subsequently disaggregated into "no progress" and "some progress", to recognize countries that are making progress but not at the rate required to meet the 2025 WHA target. Global Nutrition Report 2015. International Food Policy Research Institute, Washington 2015.
[26]Are determinants of Rural and Urban Food Security and Nutritional Status Different? Some Insights from Mozambique. World
[27]The determinants of child health and nutrition-A meta-analysis. Washington, D.C.: World Bank 2005

In developing countries, stunting follows an age pattern: prevalence rise quickly after about six months, peaks often about 24 months and slowly decreases after 36 months of age. Therefore, the age of the child conforms to the interpretation of the findings: for children in the age group below 2-3 years, low height-for-age probably reflects a continuing process of "failing to grow" or "stunting", while for older children, it reflects a state of "having failed to grow" or "being stunted"[28]. Stunting, therefore, reflects failure to receive adequate nutrition over a long period of time and it is affected by recurrent and chronic illness. It represents the long-term effects of malnutrition in a population and is not sensitive to recent, short-term changes in dietary intake. Since the effects of stunting are not completely reversible and stunted children will grow up becoming small adults, chronic malnutrition has a lifelong impact on the individual, the community and the nation.

[28]WHO, Global Database on Child Growth and Malnutrition at http://www.who.int/nutgrowthdb/about/introduction/en/index2.html

Table 9: Prevalence of overall, moderate and severe stunting status (Height-for-Age) in children 0 to 59 months of age by background characteristics (WHO 2006)

Background Characteristic	Total N	Prevalence of Stunting (HAZ<-2)	Prevalence of Moderate	Prevalence of Severe
National	18,781	32.0	21.2	10.8
		[30.7-33.4]	[20.3-22.1]	[10.0-11.5]
Sex				
Male	9,441	34.8	22.5	12.3
		[33.2-36.4]	[21.4-23.6]	[11.4-13.3]
Female	9,340	29.2	19.9	9.2
		[27.7-30.6]	[18.8-21.0]	[8.4-10.1]
Age group				
0-5 Months	1,932	17.9	12.3	5.6
		[15.8-19.9]	[10.5-14.1]	[4.3-6.8]
6-11 Months	2,034	26.5	18.1	8.4
		[24.2-28.8]	[16.1-20.1]	[6.9-9.8]
12-23 Months	3,836	38.2	24.3	13.9
		[36.2-40.3]	[22.7-25.9]	[12.5-15.4]
24-35 Months	3,817	35.4	21.8	13.6
		[33.2-37.6]	[20.2-23.4]	[12.2-15.0]
36-47 Months	3,734	34.3	23.3	11.0
		[32.1-36.6]	[21.6-25.0]	[9.7-12.3]
48-59 Months	3,428	29.8	21.6	8.2
		[27.7-31.9]	[19.9-23.3]	[7.1-9.3]
Geopolitical Zone				
North Central	3,477	29.7	21.3	8.4
		[27.3-32.2]	[19.4-23.3]	[7.1-9.7]
North East	4,118	42.8	27.9	14.8
		[40.4-45.2]	[26.3-29.6]	[13.3-16.4]
North West	5,628	50.4	30.0	20.5
		[48.2-52.6]	[28.5-31.5]	[18.8-22.2]
South East	1,589	17.2	12.7	4.5
		[14.8-19.6]	[10.8-14.7]	[3.4-5.6]
South South	2,129	20.4	14.9	5.5
		[18.1-22.7]	[13.0-16.8]	[4.4-6.6]
South West	1,840	20.8	15.5	5.3
		[18.3-23.3]	[13.4-17.6]	[4.2-6.4]
State				
Abia	279	17.9	13.3	4.7
		[13.3-23.7]	[9.2-8.7]	[2.6-8.1]
Adamawa	554	39.4	30.3	9.0
		[33.1-46.0]	[25.3-35.8]	[6.8-12.0]
Akwa-Ibom	366	25.7	19.7	6.0
		[21.0-31.0]	[15.8-24.2]	[3.8-9.4]

Table 9: Continued

Background Characteristic	Total N	Prevalence of Stunting (HAZ<-2)	Prevalence of Moderate	Prevalence of Severe
Anambra	329	11.9	10.3	1.5
		[8.1-17.0]	[7.1-14.7]	[0.6-3.5]
Bauchi	859	45.6	29.3	16.3
		[41.1-50.2]	[26.2-32.6]	[13.7-19.3]
Bayelsa	337	19.9	13.9	5.9
		[15.4-25.3]	[10.3-18.5]	[3.4-10.1]
Benue	486	23.9	17.3	6.6
		[19.5-28.9]	[13.3-22.2]	[4.6-9.3]
Borno	612	37.3	27.9	9.3
		[32.1-42.7]	[23.6-32.8]	[7.1-12.2]
Cross River	410	22.0	17.8	4.1
		[17.6-27.0]	[13.8-22.7]	[2.8-6.2]
Delta	325	18.2	13.5	4.6
		[13.4-24.1]	[9.4-19.0]	[2.6-8.0]
Ebonyi	380	25.0	17.6	7.4
		[20.9-29.6]	[14.0-22.0]	[4.9-10.9]
Edo	312	17.0	15.4	1.6
		[12.5-22.7]	[11.1-21.0]	[0.6-4.3]
Ekiti	284	20.8	16.5	4.2
		[15.2-27.8]	[11.9-22.6]	[2.1-8.3]
Enugu	269	14.5	11.2	3.3
		[10.5-19.7]	[7.3-16.8]	[1.7-6.3]
FCT	396	17.9	14.1	3.8
		[12.7-24.6]	[10.1-19.5]	[2.1-6.8]
Gombe	753	44.6	27.0	17.7
		[39.8-49.6]	[23.5-30.8]	[13.7-22.4]
Imo	291	16.8	14.8	2.1
		[11.8-23.5]	[10.3-20.8]	[0.8-5.0]
Jigawa	827	54.1	34.2	19.8
		[48.7-59.3]	[30.3-38.4]	[16.2-24.0]
Kaduna	550	42.9	27.1	15.8
		[37.0-49.1]	[22.1-32.7]	[11.9-20.7]
Kano	781	46.0	26.8	19.2
		[41.0-51.0]	[23.5-30.3]	[15.7-23.3]
Katsina	890	58.0	34.2	23.8
		[52.0-68.3]	[31.1-37.4]	[19.5-28.8]
Kebbi	816	51.8	32.8	19.0
		[47.1-56.6]	[29.3-36.6]	[16.3-22.0]
Kogi	353	22.7	18.1	4.5
		[16.9-29.6]	[12.9-24.9]	[2.6-7.7]
Kwara	412	29.4	22.6	6.8
		[23.6-35.9]	[17.7-28.3]	[4.6-9.9]

Table 9: Continued

Background Characteristic	Total N	Prevalence of Stunting (HAZ<-2)	Prevalence of Moderate	Prevalence of Severe
Lagos	318	12.9	10.7	2.2
		[9.2-17.8]	[7.5-15.1]	[1.1-4.3]
Nasarawa	467	33.2	25.9	7.3
		[27.5-39.4]	[21.2-31.3]	[4.9-10.8]
Niger	774	33.9	25.2	8.7
		[28.2-40.0]	[21.0-29.9]	[6.2-11.9]
Ogun	365	29.6	21.9	7.7
		[24.6-35.1]	[17.9-26.5]	[5.4-10.7]
Ondo	252	24.2	15.9	8.3
		[18.6-30.9]	[11.5-21.6]	[5.2-13.1]
Osun	239	20.9	16.7	4.2
		[16.2-26.5]	[12.7-21.8]	[2.2-8.0]
Oyo	348	23.0	19.0	4.0
		[17.3-29.9]	[13.8-25.6]	[2.4-6.7]
Plateau	509	42.8	30.3	12.6
		[36.0-50.0]	[26.1-34.7]	[8.7-17.8]
Rivers	320	16.3	12.5	3.8
		[11.4-22.6]	[8.5-17.9]	[2.0-6.8]
Sokoto	801	53.8	34.1	19.7
		[49.3-58.3]	[31.1-37.2]	[16.2-23.8]
Taraba	517	31.9	22.6	9.3
		[25.9-38.6]	[18.8-26.9]	[6.1-13.8]
Yobe	712	55.8	33.0	22.8
		[50.6-60.8]	[29.2-37.1]	[18.8-27.3]
Zamfara	762	55.6	32.1	23.6
		[49.9-61.2]	[29.0-35.3]	[18.8-29.1]

Trends of Acute Malnutrition

Much of a child's future is determined by the quality of nutrition in the early stages of life and specifically during the first 1,000 days. This period – which spreads from the conception to the child's second birthday – is in fact a critical window, during which the brain and body grow rapidly and so good nutrition is essential to lay the foundation for healthy cognitive and physical development. If children do not get the right nutrients during this period, the damage is often irreversible[29].

Figure 7 shows trends of malnutrition by age of child in months, demonstrating which age bands are more critical in regard to risks to malnutrition. Stunting increases progressively until it reaches a peak around 23 and 35 months of age. Underweight increases less and reaches its peak earlier in age (between 12 and 23 months). Prevalence of global acute malnutrition based on WHZ and MUAC shows corresponding decreasing trend from twelve months on. In this survey, the MUAC based indicator for acute malnutrition varied more by age than did WHZ based indicator, especially in the 6-12 months age bracket.

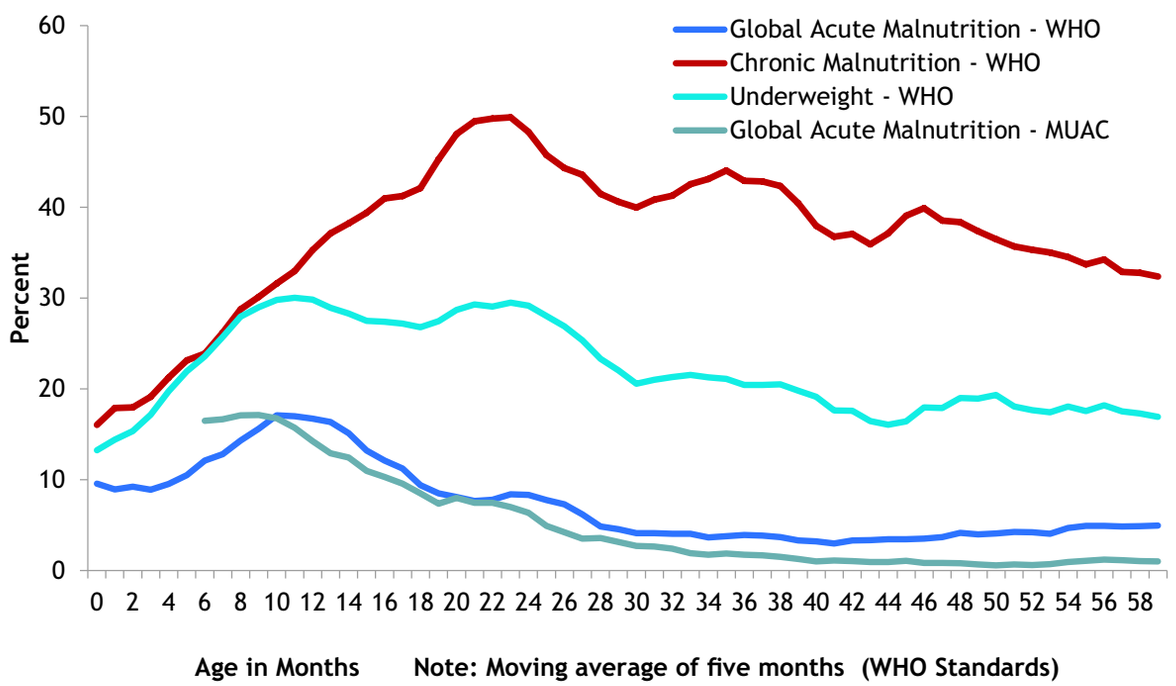

Figure 7: Trends of GAM, Stunting, Underweight and MUAC<125mm by age in months (plotted values are smoothed by a moving average of 5 months)

[29]Nutrition in the first 1,000 days, State of the World's Mothers 2012, Save the Children, 2012

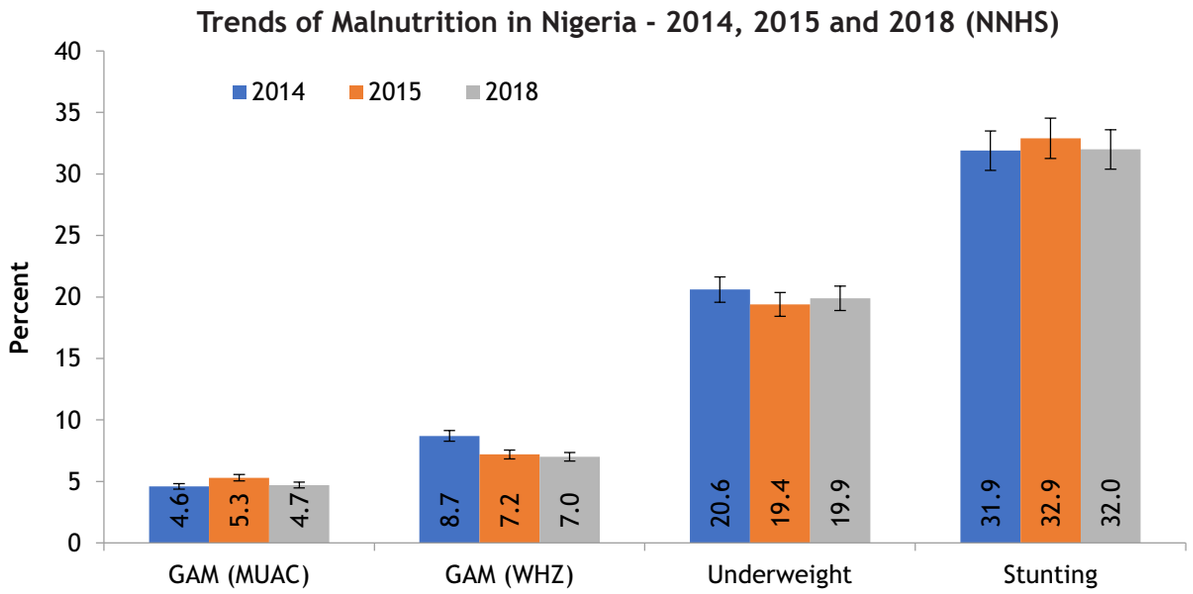

Figure 8: Trends of GAM, Underweight and Stunting in Nigeria over the years (2014, 2015 and 2018)

Trends based of malnutrition over the years (2014-2018) indicate similar rates for acute malnutrition using MUAC for 2018 and 2014 findings but an improvement from the 2015 results; however when using WHZ, the levels remain the same for 2018 and 2015 results, but an improving trend and significant change from the 2014 findings (Fig. 8). The prevalence of underweight and stunting in 2018 have more or less stagnated at the same levels since 2014.

Dual Malnutrition Deficits

The burden of child malnutrition is generally reported separately for wasting, stunting, underweight, and micronutrient deficiencies and many studies report associations between stunting, wasting, and underweight and mortality of under 5 children. However, estimates of the effects of individual anthropometric indicators overlook the fact that multiple deficits may occur simultaneously, especially because all deficits are associated with poverty, disease history, and poor dietary intake. A study conducted in 10 countries in 2013 estimated that a child with comorbidities of stunting, wasting and underweight has a 12 fold elevated risk of mortality than a child with no nutritional deficit[30].

Recent evidence compiled in WHO's Global Nutrition Policy Review highlights that existing national nutrition policies tend not to adequately integrate all forms of malnutrition and data on the share of children who are not stunted, wasted or underweight should be reported more frequently to provide

[30]The effect of multiple anthropometric deficits on child mortality: meta-analysis of individual data in 10 prospective studies from developing countries, McDonald et al. AJCN 2013

additional rationale for investing in nutrition, especially in fragile contexts where multiple types of child growth impairments are likely to be observed. The same line of reasoning is echoed by the latest Global Nutrition Report. The extent of these concurrent deficits, and the implications for mortality and programming, are quite serious, because this population is significant in size and is often missed by programs targeting single nutrition deficits alone. The development and implementation of comprehensive, multilevel approaches that cover all forms of malnutrition should be fostered.

Table 10 shows the comorbid burden of stunting and wasting in children in Nigeria in 2018. Children growing up healthy are 64 percent, implying that nearly one in three children in the country still experience some kind of nutrition deficit. Children experiencing the co-occurrence of stunting and wasting are 3.3 percent with 0.5 percent experiencing severe stunting and severe wasting together, which likely suggests an early environment characterized by harsh deprivation. Therefore it is highly advised that multiple malnutrition indicators are introduced in screening, referral, treatment, and discharge procedures in both community-and facility-based programs. At the same time the country faces a small proportion of overnutrition (overweight) in some parts.

Table 10: Extent of wasting and stunting in the same children

	No stunting	**Moderate stunting**	**Severe stunting**	**Total**
No wasting	64.1	19.6	9.2	92.9
	[62.8-65.5]	[18.7-20.5]	[8.5-9.9]	[92.5-93.4]
	11,099	4,159	2,066	17,324
Moderate wasting	3.2	1.4	1.1	5.6
	[2.9-3.5]	[1.2-1.6]	[0.9-1.2]	[5.2-6.1]
	584	285	238	1,107
Severe wasting	0.7	0.3	0.5	1.5
	[0.6-0.8]	[0.2-0.4]	[0.3-0.6]	[1.2-1.6]
	135	54	100	289
Total	68.0	21.3	10.7	100
	[66.7-69.4]	[20.3-22.1]	[10.0-11.5]	-
	11,818	4,498	2,404	18,720

Overweight

The weight-for-height index also provides data on overweight. Children that are above two standard deviations (+2 SD) from the reference median are considered overweight. Although globally the majority of overweight children are in high-income countries with WHZ score curves shifted to the right, some low-income countries are starting to have a growing problem of overweight. In 2013, UNICEF, WHO, and World Bank estimated an increase of the global prevalence of childhood overweight from 5 to 7 percent in a 12-years period from 2000 to 2012. Childhood overweight results

in immediate issues, such as metabolic abnormalities including raised cholesterol, triglycerides and glucose, type 2 diabetes, and high blood pressure. Childhood overweight is also a strong risk factor for adult obesity and its consequences, which in turn has vast implications for the overall development of a nation. For these reasons, in 2012, the WHAR resolution has included overweight among its nutrition indicators.

Table 11: Prevalence of Overweight (WHZ>2) in children 0 to 59 months of age by background characteristics (WHO 2006)

Background Characteristics	Total N	Overweight (WHZ >2)
National	18,766	1.2 [1.0 - 1.4]
Sex		
Male	9,443	1.5 [1.1 – 1.8]
Female	9,323	0.9 [0.7 – 1.1]
Age group		
0-5 Months	1,905	4.1 [3.1-5.2]
6-11 Months	2,038	1.2 [0.7- 1.1]
12-23 Months	3,840	0.8 [0.4 – 1.2]
24-35 Months	3,821	1.2 [0.8 – 1.7]
36-47 Months	3,738	0.7 [0.4 – 0.9]
48-59 Months	3,424	0.4 [0.2 – 0.6]
Geopolitical Zone		
North Central	3,470	1.4 [1.0 – 1.9]
North East	4,116	1.5 [1.1 – 2.0]
North West	5,625	1 [0.7 – 1.3]
South East	1,588	1.4 [0.7 – 2.0]
South South	2,128	0.8 [0.5 – 1.2]
South West	1,839	1.1 [0.5 – 1.7]
State		
Abia	290	0.7 [0.2 - 2.8]
Adamawa	561	1.4 [0.7 - 2.8]
Akwa-Ibom	382	0.3 [0.0 - 2.0]
Anambra	332	0.9 [0.3 - 2.9]

Table 11: continued

Background Characteristics	Total N	Overweight (WHZ >2)
Bauchi	864	0.5
		[0.2 - 1.2]
Bayelsa	344	1.7
		[0.6 - 4.7]
Benue	497	0.8
		[0.3 - 2.1]
Borno	622	0.2
		[0.0 - 1.3]
Cross River	413	1.2
		[0.4 - 3.4]
Delta	332	0.3
		[0.0 - 2.2]
Ebonyi	385	0.3
		[0.0 - 1.9]
Edo	317	0.6
		[0.2 - 2.6]
Ekiti	291	1
		[0.3 - 3.2]
Enugu	272	0.7
		[0.1 - 5.5]
FCT	396	1
		[0.3 - 3.5]
Gombe	774	0.4
		[0.1 - 1.2]
Imo	293	0.7
		[0.2 - 2.9]
Jigawa	843	0.1
		[0.0 - 0.9]
Kaduna	556	0.5
		[0.2 - 1.6]
Kano	807	0.7
		[0.3 - 1.7]
Katsina	904	1.4
		[0.7 - 2.8]

According to the Global Nutrition Report 2015, Nigeria was reported as being "on course" of achieving "good progress" in terms of overweight. National overweight prevalence is 1.2 percent (95% CI: 1.0-1.4) and has not changed much from 2015 (1.6%) and since 2014 (1.5%). Nigeria has also an overweight prevalence below the 7 percent threshold in all states surveyed. Highest prevalence was reported in Taraba (3.5 percent), followed by Bayelsa (1.7 percent), Adamawa and Katsina (1.4 percent). Overweight prevalence by state is presented in Table 11.

[31]To be catalogued as "on course" for overweight indicators, countries had to have a current under 5 overweight rate below 7 percent. In addition, countries were disaggregated into the narrower categories of "good progress" (threshold is decreasing), "some progress" (threshold is stable) and "no progress" (threshold is increasing). Global Nutrition Report 2015. International Food Policy Research Institute, Washington 2015.

Child Health

Vaccination Coverage

Immunisation is one of the most cost-effective ways of preventing many under-five deaths. Therefore immunisation coverage[32] is one of the indicators used to monitor progress toward the reduction of child morbidity and mortality. The Nigerian Expanded Programme on Immunization (EPI) was initiated in 1979. Significant progress was made in the 1980's with the Universal Child Immunization (UCI) when 80 percent coverage for all antigens was recorded. Since then, performance of EPI has stagnated with interludes of declines and improvements – routine immunisation coverage in the last decade ranging from 27 to 114 percent[33].

For these reasons, in the last five years, Nigeria has introduced several child survival initiatives and expanded existing ones, with a particular focus on strengthening routine immunisation. In May 2012, for instance, Nigeria began the replacement of the diphtheria, pertussis, and tetanus (DPT) vaccine with the pentavalent vaccine, which contains more antigens – Haemophilus influenzae type B, and hepatitis B. The actual target is to ensure full immunisation of children less than one year at 90 percent nationally, with at least 80 percent coverage in each state.

In this survey, mothers were asked to provide vaccination card and interviewers copied vaccination information from the cards onto the questionnaire. If the child had no vaccination card, the respondent was asked to recall the vaccine given to the child. If the mother indicated that the child had received DTP/Penta, she was asked the number of dose(s) the child had received.

Overall, 57.2 percent of children aged 12-23 months had received the third dose of DPT/Penta at the time of the survey, an improvement from 48.8 percent reported in 2015, but comparable to 2014 findings – where 52.2 percent of children had received DTP/Penta 3. Figure 9 compares 2014, 2015 and 20158 DTP/Penta 3 immunisation findings by zone. Great variability was again observed in the zones, with South East, South West, and South South having higher coverage (82.9, 78.5, and 74.2

[32]According to WHO, a child is considered fully vaccinated if she or he has received vaccination against tuberculosis; three doses of vaccine to prevent diphtheria, pertussis, and tetanus; at least three doses of polio vaccine; and one dose of measles vaccine; during the first year of life. That is the reason why vaccination coverage information generally focuses on the 12- to 23-month age group (i.e., the typical age by which children should have received all basic vaccinations).

[33]Findings from several reviews and studies refer to a wide range of issues hampering the proper implementation of the immunisation programme in Nigeria including weak governance, inadequate funding, vaccine stock-out, lack outs of vaccine bundling, distribution challenges, non-maintenance of Cold Chain Equipment (CCE), and poor staff performance at state and local government levels. Nigerian National Routine Immunisation Strategic Plan (2013-15), National Primary Health Care Development Agency, Nigeria 2012.

percent respectively). North West (29 percent) and North East (48 perecnt) have been persistently recording low coverage below 50 percent since 2014, but with increased proportion of children vaccinated in this survey. Coverage has been reducing gradually in North central from 55 percent in 2014 to 50 percent in 2018.

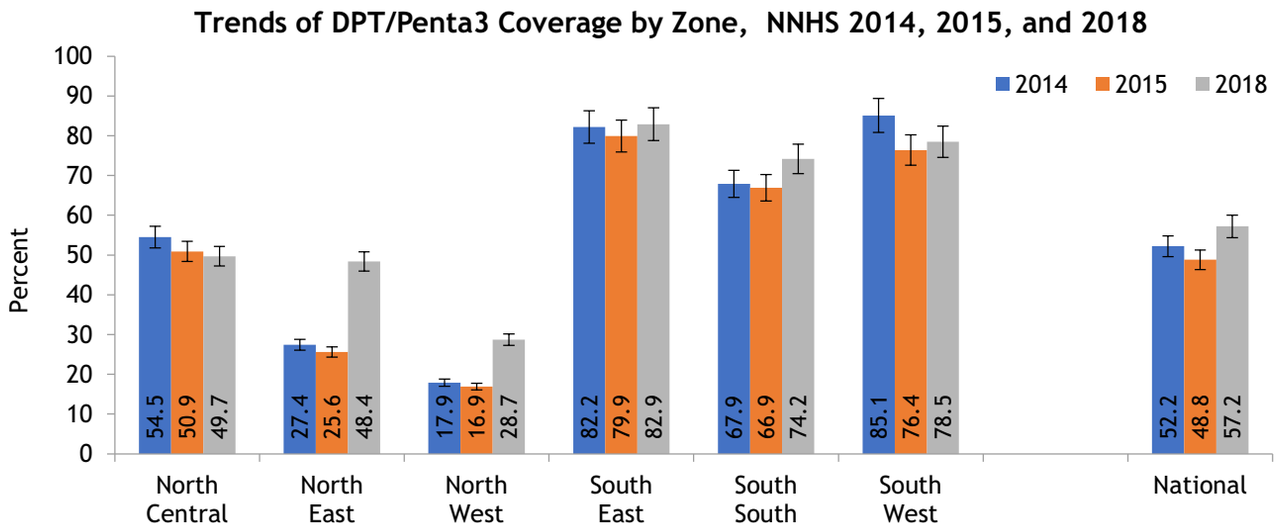

Figure 9: DTP/Penta 3 immunisation coverage by zone (2014, 2015 and 2018)

At state level, coverage is very low in the North East states of Zamfara (12%), Katsina (12%), Kebbi (19.3%), and Sokoto (22.4%)[34]. Highest coverage was recorded in Lagos (92.6%) with a total of eleven states (Lagos, Ekiti, Osun, Imo, Abia, Enugu, Rivers, Edo, Cross River, Anambra and FCT), reporting good coverage of above 80 percent (Table 12). In 2015, only five states – Edo, Ekiti, Enugu, Imo and Lagos – achieved the targeted 80 percent DPT/Penta 3 coverage and in 2014, eleven states out of 37 achieved the targeted 80 percent coverage. In 2015, only five states – Edo, Ekiti, Enugu, Imo and Lagos – achieved the targeted 80 percent DPT/Penta 3 coverage, and coverage was less than 25 percent in nine states. Coverage was particularly low in Kebbi, Sokoto, Yobe and Zamfara, where less than one in ten children was immunized. On the other hand, the overall dropout rate (from DTP/Penta 1 to DTP/Penta 3) has dropped to 13 from 22 percent in 2015 and 14 percent in 2014.

[34]A baseline assessment in 7 LGAs in 6 northern states showed that DPT3 coverage at the LGA level for outreach settlements (those >5 km from a health facility) is as low as 3%. The Nigerian Vaccine Wastage Study Report - November 2011, WHO-UNICEF-CDC.

Table 12: Percentage of children 12-23 months vaccinated against preventable childhood diseases at any time before the survey by domain and zone.

Background Characteristics	Any Vaccine	With Card	Penta1	Penta2	Penta3	Measles vaccine	No of Children 12-23 Months
National	79.3	39.8	69.9	65.4	57.2	64.7	3,976
	[77.2-81.3]	[37.2-42.3]	[67.5-72.3]	[62.9-68.0]	[54.4-60.0]	[62.3-67.1]	
Sex of child							
Male	79.8	39.9	71.3	66.5	58.2	64.7	1,995
	[77.4-82.1]	[36.5-43.2]	[63.7-69.4]	[54.9-61.4]	[54.9-61.4]	[61.7-67.7]	
Female	78.7	39.6	68.5	64.2	56.2	64.7	1,981
	[76.2-81.2]	[36.7-42.6]	[65.5-71.4]	[61.1-67.4]	[52.9-59.5]	[61.8-67.5]	
Zone							
North Central	83.1	40.7	67.1	62.3	49.7	69.2	723
	[79.7-86.6]	[35.4-46.0]	[61.9-72.3]	[56.9-67.7]	[44.2-55.3]	[64.8-73.5]	
North East	73	27.0	64.7	58.4	48.4	61.4	854
	[68.2-77.8]	[22.5-31.6]	[59.4-69.9]	[52.9-63.9]	[43.0-537]	[56.4-66.4]	
North West	56.9	20.6	42.7	36.6	28.7	39.8	1,258
	[52.0-61.9]	[17.2-24.0]	[38.0-47.4]	[32.2-41.1]	[24.4-33.0]	[35.3-44.3]	
South East	95.6	61.1	92.4	89.2	82.9	81.1	324
	[93.1-98.0]	[54.9-67.3]	[89.4-95.3]	[85.4-92.9]	[78.4-87.4]	[75.8-86.4]	
South South	89.4	49.1	85.5	83.0	74.2	73.8	427
	[85.9-93.0]	[42.9-55.3]	[81.5-89.4]	[78.9-87.2]	[69.2-79.3]	[68.8-78.8]	
South West	92.8	52.9	86.9	83.4	78.5	80.2	390
	[89.2-96.4]	[46.2-59.7]	[82.3-91.5]	[78.0-88.8]	[72.2-84.8]	[74.4-86.0]	
State							
Abia	95.5	53.0	95.5	90.9	86.4	86.4	66
	[90.5-100]	[38.2-67.9]	[90.5-100]	[83.0-98.8]	[77.9-94.8]	[76.8-95.9]	
Adamawa	83.5	28.6	69.9	63.2	51.9	68.4	133
	[73.8-93.1]	[17.2-40.0]	[57.1-82.8]	[46.8-79.6]	[36.6-67.1]	[57.1-79.7]	
Akwa-Ibom	83.5	49.4	81.2	81.2	65.9	63.5	85
	[73.6-93.5]	[37.7-61.1]	[71.2-91.2]	[71.2-91.2]	[54.6-77.2]	[52.4-74.7]	
Anambra	96.2	59.5	91.1	86.1	81.0	77.2	79
	[92.1-100]	[47.5-71.4]	[85.3-97.0]	[77.3-94.9]	[70.8-91.2]	[64.1-90.3]	
Bauchi	65.9	18.2	52.8	48.3	41.5	54.5	176
	[54.7-77.1]	[9.9-26.4]	[43.9-66.3]	[38.2-59.5]	[31.2-52.9]	[43.7-65.4]	
Bayelsa	76.7	33.3	60.0	53.3	41.7	51.7	60
	[64.9-88.4]	[21.3-45.4]	[44.1-759]	[37.7-67.0]	[23.1-60.3]	[32.4-70.9]	
Benue	84.4	37.5	62.5	55.2	40.6	60.4	96
	[76.8-91.9]	[24.5-50.5]	[49.2-75.8]	[41.9-68.5]	[28.2-53.1]	[49.9-70.9]	
Borno	66.7	27.7	60.5	57.1	44.5	54.6	119
	[52.2-81.1]	[18.3-37.2]	[46.5-74.6]	[43.2-71.1]	[30.8-58.3]	[40.3-68.9]	
Cross River	89.4	64.7	89.4	87.1	81.2	75.3	85
	[82.0-96.8]	[51.2-78.3]	[82.0-96.8]	[79.3-94.8]	[71.5-90.8]	[61.6-89.0]	
Delta	93.8	34.4	84.4	79.7	73.4	79.7	64
	[86.5-100]	[21.5-47.2]	[73.9-94.9]	[68.5-90.9]	[59.7-87.2]	[69.0-90.4]	
Ebonyi	94.0	76.1	91.0	89.6	74.6	74.6	67
	[87.0-100]	[65.5-86.8]	[83.4-98.7]	81.5-97.2]	[65.4-83.8]	61.9-87.3]	
Edo	95.3	54.7	93.8	90.6	81.3	87.5	64
	[90.2-100]	[40.1-69.3]	[88.1-99.4]	[83.1-98.1]	[70.7-91.8]	[81.3-93.7]	

Table 12: Continued

Background Characteristics	Any Vaccine	With Card	Penta1	Penta2	Penta3	Measles vaccine	No of Children 12-23 Months
Ekiti	98.5	43.1	96.9	95.4	92.3	92.3	65
	95.5-100]	[29.6-56.6]	[92.7-100]	[90.1-100]	[85.8-98.8]	[85.5-99.1]	
Enugu	94.9	61.0	88.1	86.4	83.1	79.7	59
	[88.0-100]	[49.3-72.8]	[80.1-96.2]	[78.8-94.1]	[74.5-91.6]	[68.3-91.0]	
FCT	89.0	69.5	87.8	85.4	80.5	85.4	82
	[78.5-99.5]	[59.0-80.0]	[77.7-97.9]	[73.8-96.9]	[67.0-94.0]	[73.6-97.1]	
Gombe	69.7	31.5	61.2	55.2	49.1	63.0	165
	[58.5-80.9]	[21.6-41.4]	[52.7-77.0]	[42.8-67.5]	[37.5-60.7]	[52.0-74.0]	
Imo	96.2	62.3	96.2	94.3	86.8	86.8	53
	[91.2-100]	[47.0-77.5]	[91.2-100]	[88.4-100]	[77.0-966]	[77.0-94.6]	
Jigawa	72.7	24.5	53.7	49.5	38.0	62.0	216
	[62.9-82.4]	[15.4-33.6]	[43.4-64.0]	[399-59.2]	[29.5-46.5]	[52.5-71.6]	
Kaduna	83.6	25.4	54.1	51.6	45.9	68.0	122
	[75.2-92.0]	[14.9-35.9]	[39.2-69.0]	[36.5-66.7]	[31.1-60.7]	[59.3-76.7]	
Kano	63.3	23.8	55.1	47.6	36.1	49.0	147
	[52.9-73.7]	[14.9-32.7]	[45.9-68.3]	[39.4-59.9]	[27.3-48.9]	[39.1-58.8]	
Katsina	34.4	13.4	27.3	20.1	12.0	15.8	209
	[24.5-44.4]	[6.4-2.04]	[18.5-36.0]	[12.2-28.0]	[4.8-19.2]	[9.6-22.0]	
Kebbi	53.6	19.8	35.4	23.4	19.3	18.8	192
	[39.9-67.4]	[12.7-26.9]	[25.3-45.6]	[15.0-31.8]	[10.9-27.6]	[10.9-26.6]	
Kogi	79.2	36.1	66.7	65.3	52.8	70.8	72
	[68.6-89.8]	[21.6-50.6]	[55.3-78.0]	[53.7-76.0]	[39.6-66.0]	[58.1-83.6]	
Kwara	73.8	35.7	57.1	53.6	46.4	63.1	84
	[61.5-86.1]	[23.1-48.3]	[41.2-73.1]	[37.8-69.4]	[28.9-63.9]	[50.6-75.6]	
Lagos	97.1	66.2	94.1	94.1	92.6	95.6	68
	[91.4-100]	[53.7-78.7]	[87.6-100]	[87.6-100]	[83.7-100]	[87.1-100]	
Nasarawa	88.2	45.9	82.4	77.6	58.8	67.1	85
	[80.9-95.6]	[30.6-61.1]	[73.5-91.2]	[68.5-86.8]	[48.4-69.3]	[55.8-78.3]	
Niger	80.9	31.7	49.2	43.7	33.3	69.4	183
	[75.0-86.8]	[22.6-40.8]	[36.9-62.5]	[31.8-56.7]	[22.6-45.2]	[61.6-72.2]	
Ogun	90.0	37.5	76.3	70.0	63.8	70.0	80
	[83.6-96.4]	[22.7-52.3]	[66.7-85.8]	[61.1-78.9]	[53.9-73.6]	[58.8-81.2]	
Ondo	98.1	57.4	87.0	81.5	72.2	85.2	54
	[94.8-100]	[40.3-74.5]	[77.3-96.7]	[67.0-96.0]	[56.0-87.7]	[76.9-93.4]	
Osun	99.9	47.1	98.0	90.2	86.3	70.6	51
	[100-100]	[30.4-63.7]	[94.2-100]	[78.2-100]	[73.3-99.2]	[55.7-85.5]	
Oyo	77.8	47.2	70.8	66.7	58.3	59.7	72
	[66.2-89.3]	[34.3-60.1]	[57.0-84.7]	[51.1-82.2]	[41.5-75.1]	[45.9-73.5]	
Plateau	88.4	42.1	81.0	74.4	55.4	71.1	121
	[78.3-98.6]	[26.2-58.1]	[70.5-91.5]	[61.5-87.2]	[39.7-71.0]	[58.0-84.2]	
Rivers	91.3	52.2	89.9	88.4	82.6	75.4	69
	[84.1-98.5]	[37.7-66.6]	[82.6-97.1]	[80.9-95.9]	[74.0-91.2]	[65.1-85.6]	
Sokoto	50.0	23.1	33.3	26.9	22.4	23.7	156
	[37.2-62.8]	[14.4-31.7]	[23.5-43.2]	[17.7-36.1]	[13.0-31.9]	[15.0-32.4]	
Taraba	81.7	29.4	77.1	70.6	56.0	66.1	109
	[71.9-91.4]	[16.6-42.2]	[65.6-88.5]	[59.3-82.0]	[43.3-68.6]	[55.1-77.0]	

Table 12: Continued

Background Characteristics	Any Vaccine	With Card	Penta1	Penta2	Penta3	Measles vaccine	No of Children 12-23 Months
Yobe	72.4	34.9	67.8	63.2	51.3	64.5	152
	[61.8-82.9]	[21.4-48.4]	[57.6-77.9]	[53.4-72.9]	[41.3-61.3]	[52.7-76.2]	
Zamfara	28.2	12	20.8	17.1	12	20.4	216
	[16.6-39.9]	[5.8-18.2]	[12.0-29.7]	[9.3-25.0]	[5.6-18.5]	[11.7-29.0]	

Measles Vaccination

Measles is a highly contagious viral respiratory tract infection caused by a Morbillivirus. It only affects humans and rapidly spreads among individuals who have not been vaccinated. Symptoms include high fever, coughing and skin rashes and it can be fatal if not treated quickly. About 1 to 5 percent of children with measles die from complications of the disease[35]. Immunisation from measles is effective, and has resulted in significant reductions in case burden in many parts of the world. A child is considered adequately immunised against measles after receiving only one dose of vaccine, usually at 9 months of age. Unfortunately, a large percentage of children never receive their first measles vaccine dose in time for immunity to take effect. Failure to vaccinate children against measles puts them at risk of severe health complications such as pneumonia, diarrhoea, encephalitis, and blindness[36].

Overall measles vaccination coverage at 64.7 percent has remained in the range of 51-65 percent since 2014 (64 percent) having slightly increased from 51 percent in 2015 (Fig 10). This means one in three eligible children still did not receive any measles vaccine at all. Measles vaccination is part of the services offered in MNCHWs campaigns in Nigeria, besides the routine health facility and stand-alone measles campaigns, to boost vaccination coverage. It is important to note that immunisation data are prevalently based on mothers' (caregivers) recall, therefore poor measles immunisation coverage could be due to the time lapse between the MNCHW/measles campaign, if conducted, and survey data collection. Table 13 shows coverage for both penta and measles by card or caregiver's recall. In general, North West reported the poorest[37] rates of immunisation (40 percent) compared to the other zones, while South East (81.1 percent) recorded the highest rate, together with South West (80.2 percent) meeting the 80 percent threshold. There was a general improvement nationally and across the zones in comparison to the 2015 results.

[35]Measles, Fact sheet N°286 - Reviewed February 2015, WHO.
[36]Measles pre-elimination Programme Fact sheet, Regional Office for Africa, WHO, 2014
[37]Low coverage in Northern states is often explained by the frequent lack of vaccines in these areas. Northern Nigeria MNCH Programme: Selected Analyses from Population-Based Baseline Survey. Columbia University 2012.
[38]In Zamfara, for instance, although mother's attitude towards immunization is generally positive, many believed that it could cause infertility in children. Determinants of routine immunization coverage in Bungudu, Zamfara State, Northern Nigeria, May 2010, Pan African Medical Journal 2014.

Only seven states (Lagos, Ekiti, Edo, Imo, Abia, FCT and Ondo) reached the target of 80 percent. Nineteen states had coverage between 50 and 80 percent and fourteen states had coverage less than 50 percent. Coverage was again particularly low in Kebbi, Sokoto, Yobe and Zamfara[38]. Overall, more than 20 percent of children aged 12-23 months received no vaccine at all. These results, which are consistent with DHS and MICS findings, call for the need to strengthen routine immunisation programmes, especially in the highlighted areas, in order to reduce infant and child mortality rates.

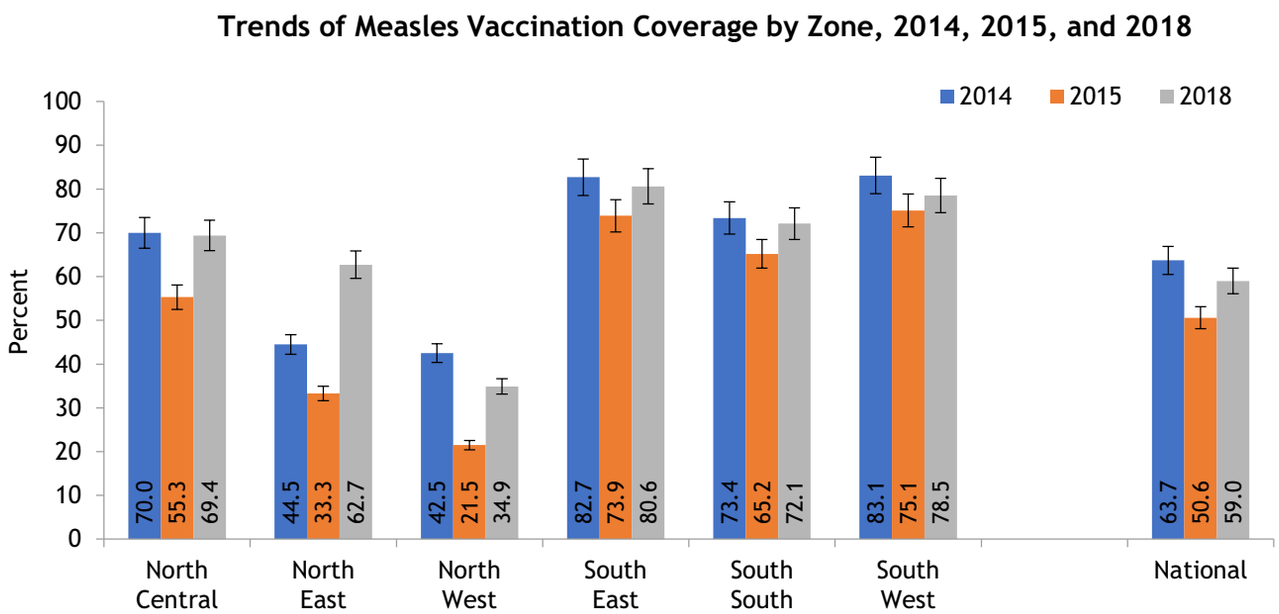

Figure 10: Measles immunisation coverage by zone (2014, 2015, and 2018)

[38]In Zamfara, for instance, although mother's attitude towards immunization is generally positive, many believed that it could cause infertility in children. Determinants of routine immunization coverage in Bungudu, Zamfara State, Northern Nigeria, May 2010, Pan African Medical Journal 2014.

Table 13: Immunization coverage among children 12-23 months by Card and Recall

Background Characteristics	% children recieved Penta vaccine		% children received measles vaccine		No of Children 12-23 Months
	By Card	By Recall	By Card	By Recall	
National	38.0	31.9	33.4	31.3	3,976
	[35.4-4.6]	[29.9-33.9]	[30.7-36.0]	[29.3-33.4]	
Sex of child					
Male	38.1	33.2	33.3	31.5	1,995
	[34.8-41.5]	[30.4-35.9]	[29.8-36.7]	[28.7-34.3]	
Female	37.9	30.6	33.5	31.2	1,981
	[34.9-40.8]	[28.0-33.2]	[30.6-36.4]	[28.6-33.7]	
Zone					
North Central	38.0	29.1	34.2	34.9	723
	[32.7-43.3]	[24.8-33.3]	[29.4-39.1]	[29.9-39.9]	
North East	26.3	38.3	23.7	37.7	854
	[2.8-30.8]	[33.8-42.9]	[19.3-28.0]	[33.2-42.2]	
North West	18.1	24.6	15.1	24.7	1,258
	[14.8-21.4]	[21.3-27.9]	[12.0-18.2]	[20.9-28.5]	
South East	59.6	32.7	50.0	31.1	324
	[53.3-66.0]	[26.7-38.7]	[43.6-56.5]	[25.0-37.2]	
South South	48.6	36.9	42.3	31.5	427
	[42.4-54.7]	[31.6-42.3]	[36.3-48.3]	[26.2-36.7]	
South West	51.3	35.6	46.6	33.6	390
	[44.4-58.1]	[29.7-41.5]	[38.7-54.6]	[27.6-39.6]	
State					
Abia	53.0	42.4	42.4	43.9	66
	[38.2-67.9]	[27.4-57.4]	[27.3-57.5]	[28.3-59.6]	
Adamawa	28.6	41.4	30.8	37.6	133
	[17.2-40.0]	[29.3-53.5]	[19.7-42.0]	[27.4-47.7]	
Akwa-Ibom	48.2	32.9	38.8	24.7	85
	[36.9-59.6]	[23.2-42.7]	[28.0-49.7]	[15.5-33.9]	
Anambra	57.0	34.2	44.3	32.9	79
	[43.5-70.4]	[22.0-46.3]	[32.3-56.4]	[20.6-45.2]	
Bauchi	17.6	37.5	13.6	40.9	176
	[9.8-25.4]	[28.9-46.1]	[6.8-20.5]	[31.7-50.1]	
Bayelsa	31.7	28.3	26.7	25.0	60
	[20.1-43.2]	[18.3-38.4]	[15.0-38.3]	[11.9-38.1]	
Benue	36.5	26.0	28.1	32.3	96
	[23.9-49.0]	[18.1-33.9]	[17.8-38.5]	[22.0-42.6]	
Borno	26.1	34.5	22.7	31.9	119
	[16.7-35.4]	[23.8-45.2]	[13.9-31.5]	[21.1-42.7]	
Cross River	63.5	25.9	55.3	20.0	85
	[50.4-76.7]	[16.3-35.4]	[40.0-70.6]	[10.6-29.4]	
Delta	34.4	50.0	32.8	46.9	64
	[21.0-47.7]	[37.5-62.5]	[21.1-44.5]	[35.3-58.5]	
Ebonyi	73.1	17.9	56.7	17.9	67
	[63.2-83.1]	[7.4-28.4]	[40.2-73.2]	[7.1-28.8]	
Edo	54.7	39.1	50.0	37.5	64
	[40.1-69.3]	[25.5-52.6]	[36.1-63.9]	[24.2-50.8]	

Table 13: Continued

Background Characteristics	% children recieved Penta vaccine		% children received measles vaccine		No of Children 12-23 Months
	By Card	By Recall	By Card	By Recall	
Ekiti	43.1	53.8	38.5	53.8	65
	[29.6-56.6]	[39.7-68.0]	[25.1-51.8]	[39.7-68.0]	
Enugu	61.0	27.1	54.2	25.4	59
	[49.3-72.8]	[17.8-36.5]	[43.0-65.5]	[15.0-35.9]	
FCT	68.3	19.5	63.4	22.0	82
	[57.8-78.8]	[12.0-27.0]	[50.3-76.6]	[13.6-30.3]	
Gombe	29.1	35.8	26.7	36.4	165
	[18.9-39.3]	[25.4-46.1]	[16.6-36.7]	[25.6-47.2]	
Imo	60.4	35.8	56.6	30.2	53
	[45.3-75.5]	[21.1-50.6]	[40.9-72.3]	[16.1-44.3]	
Jigawa	22.2	31.5	19	43.1	216
	[13.0-31.4]	[24.2-38.8]	[10.9-27.0]	[33.2-52.9]	
Kaduna	24.6	29.5	21.3	46.7	122
	[14.2-35.0]	[20.6-38.4]	[11.8-30.8]	[38.5-55.0]	
Kano	22.4	34.7	19.0	29.9	147
	[13.5-31.4]	[25.7-43.7]	[10.0-28.1]	[21.2-38.7]	
Katsina	9.1	18.2	6.7	9.1	209
	[3.2-15.0]	[11.8-24.5]	[2.6-10.8]	[4.5-13.7]	
Kebbi	16.1	19.3	9.9	8.9	192
	[9.7-22.6]	[11.0-27.5]	[4.6-15.2]	[3.7-14.0]	
Kogi	33.3	23.8	29.8	33.3	72
	[18.9-47.8]	[20.3-46.3]	[14.5-41.0]	[25.9-60.2]	
Kwara	33.3	23.8	29.8	33.3	84
	[20.2-46.4]	[14.9-32.7]	[19.5-40.0]	[22.7-44.0]	
Lagos	64.7	29.4	66.2	29.4	68
	[52.2-77.2]	[18.4-40.5]	[52.0-80.3]	[16.7-42.1]	
Nasarawa	44.7	37.6	36.5	30.6	85
	[30.0-59.5]	[23.6-51.7]	[22.9-50.0]	[9.0-42.2]	
Niger	24	25.7	28.4	41.0	183
	[15.3-32.8]	[16.7-34.7]	[19.7-37.1]	[31.0-50.9]	
Ogun	32.5	43.8	36.3	33.8	80
	[17.5-47.5]	[30.3-57.2]	[19.9-52.6]	[21.5-46.0]	
Ondo	55.6	31.5	50.0	35.2	54
	[38.3-72.8]	[17.3-45.7]	[32.6-67.4]	[18.6-51.8]	
Osun	47.1	51.0	21.6	49.0	51
	[30.4-63.7]	[34.8-67.2]	[7.4-35.7]	[35.3-62.7]	
Oyo	45.8	25.0	38.9	20.8	72
	[32.8-58.9]	[15.6-34.4]	[23.5-54.2]	[12.1-29.6]	
Plateau	42.1	38.8	37.2	33.9	121
	[26.2-58.1]	[25.3-52.4]	[21.3-53.1]	[20.4-47.4]	
Rivers	52.2	37.7	44.9	30.4	69
	[37.7-66.6]	[24.6-50.7]	[30.1-59.7]	[17.8-43.0]	
Sokoto	17.9	15.4	15.4	8.3	156
	[10.5-25.4]	[9.9-20.9]	[8.8-22.0]	[3.5-13.1]	
Taraba	29.4	47.7	21.1	45.0	109
	[16.6-42.2]	[34.3-61.1]	[10.0-32.2]	[31.8-58.1]	
Yobe	34.9	32.9	32.9	31.6	152
	[21.4-48.4]	[22.4-43.4]	[19.1-46.7]	[20.7-42.5]	
Zamfara	10.2	10.6	10.2	10.2	216
	[4.6-15.8]	[5.6-15.7]	[4.4-16.0]	[5.7-14.7]	

Diarrhoea, Oral Rehydration Therapy and Zinc Supplementation Coverage

Worldwide, diarrhoea is the second leading cause of death in children, after pneumonia, and is also a leading cause of malnutrition and mortality in children aged less than five years in Nigeria and in most developing countries[39]. It is frequently related to the consumption of contaminated water and to unhygienic practices in food preparation and disposal of stools. Most of these deaths are due to dehydration from loss of substantial quantities of water and electrolytes in loose stools and could be easily treated with low-osmolarity oral rehydration salt (ORS)[40]. On average, under-five children experience 2.9 episodes of diarrhoea per year in developing countries[41].

Zinc deficiency is also prevalent among young children that have a poor diet and high exposure to gastrointestinal parasites[42]. It is associated with immune system dysfunctions, growth retardation, and a high risk of morbidities, such as diarrhoea and Acute Respiratory Infection (ARI) and, subsequently, is responsible for 14 percent of all diarrhoeal deaths among children between 6 months and 5 years of age in developing countries[43]. Studies show that supplemental zinc, when combined with oral rehydration solutions (ORS), provides therapeutic benefits, reducing the duration and the severity of the diarrhoea episodes, as well as the need for advanced medical care.[44] In Nigeria, there is a high prevalence of zinc deficiency: national prevalence is estimated at 20 percent, slightly higher in rural than urban areas – 26 versus 17 percent[45]. Based on this evidence, WHO and UNICEF recommend zinc with ORS in the treatment for diarrhoea[46]. Although international guidelines exist and most developing countries have added zinc treatment to their national policy on the treatment for diarrhoea, most countries, including Nigeria, need to increase the implementation of effective programmes for managing diarrhoea[47]. Although some progress to incorporate zinc in the treatment for diarrhoea, using the primary healthcare (PHC) workers as the delivery channel, has been made, some studies report that there still exists a gap in the knowledge,

[39]Childhood Malnutrition and Infection Network. Multi-country analysis of the effects of diarrhoea on childhood stunting. Int Journal of Epidemiology 2008.
[40]With ORT it is intended a therapy with oral rehydration salts (ORS and/or recommended home fluid (RHF), such as salt/sugar solution, coconut/rice water and other recommended home fluids.
[41]Diarrhoea incidence in low- and middle income countries in 1990 and 2010: a systematic review. BMC Public Health 2012.
[42]Assessment of the risk of zinc deficiency in populations and options for its control. International Zinc Nutrition Consultative Group (IZiNCG) technical document #1. Food Nutrition Bulletin 2004.
[43]Global and regional child mortality and burden of disease attributable to zinc deficiency. European Journal of Clinical Nutrition 2009.
[44]Therapeutic effects of oral zinc in acute and persistent diarrhea in children in developing countries: pooled analysis of randomized controlled trials. American Journal of Clinical Nutrition 2000.
[45]Nigeria food consumption and nutrition survey 2001-2003: summary. International Institute of Tropical Agriculture, 2004.
[46]A daily supplementation of 20 mg zinc for 10-14 days for children with acute diarrhoea and 10 mg per day for infants below six months of age.
[47]Promotion of Zinc Tablets with ORS through Child Health Weeks Improves Caregiver Knowledge, Attitudes, and Practice on Treatment of Diarrhoea in Nigeria, International Center for Diarrhoeal Disease Research, Health and Population Nutrition Journal, 2015.

attitudes, and practice (KAP) in relation to appropriate treatment practices for diarrhoea among caregivers in Nigeria[48].

In NNHS survey, mothers are asked whether any of their children under age 5 had diarrhoea at any time during the preceding two weeks. If yes, the mother (or the caretaker) is asked if the child was given ORS and/or Zinc. The validity of this indicator is affected by the mother's perception of diarrhoea as an illness and her capacity to recall the events. It should be noted that the prevalence of diarrhoea also varies seasonally[49], hence the conditions of diarrhoea and its treatment should not be interpreted as constant throughout the year.

Table 14 shows the percentage of children under age 5 with diarrhoea in the two weeks before the survey who received ORS and/or Zinc or both. Overall 15 percent of children under 5 years were reported to have had diarrhoea in the two weeks preceding the survey. The prevalence of diarrhoea varied from 3 percent in Rivers to 38 percent in Sokoto. About one in four children who had had diarrhoea received treatment with ORS (26.4 percent) or Zinc (24.1 percent), almost an equal proportion but a variation from the previous results in 2015 when children prevalently received ORS (21 percent) instead of zinc tablets (6 percent). This is probably an indication that mothers and/or caregivers are taking up the zinc treatment regimen for diarrhea as recommended by the Federal Ministry of Health. More than half (51 percent) of children with diarrhoea were aged 6-23 months, while only 10 percent of children aged less than 6 months reported diarrhoea in the two weeks preceding the survey, thus implying that complementary feeding introduction – and food hygiene – is a very delicate transition period and continued breastfeeding until age of 2 years is highly recommended.

[48]Knowledge, attitude and practice of home management of childhood diarrhoea among caregivers of under-5 children with diarrhoeal disease in northwestern Nigeria. Journal of Tropical Pediatrics 2012.
[49]Distinct seasonal patterns of diarrhoea occur in many geographical areas. In temperate climates, bacterial diarrhoea occur more frequently during the warm season, whereas viral diarrhoea, particularly diarrhoea caused by rotavirus peak during the winter. In tropical area, rotavirus diarrhoea occurs throughout the year, increasing in frequency during the drier, cool months, whereas bacterial diarrhoeas peak during the warmer, rainy season. The incidence of persistent diarrhoea follows the same seasonal patterns as that of acute watery diarrhoea. WHO Readings on diarrhoea, student Manual 1992

Table 14:Percent of children under age 5 years with diarrhoea in the previous 2 weeks who received ORS or Zinc by survey domain and zone.

Background Characteristics	Diarrhea in preceding 2 weeks	Total U5s	Treated with ORS	Treated with Zinc	Total U5s with diarrhoea
National	14.5	19,471	26.4	24.1	3,330
	[13.6-15.5]		[24.0-28.9]	[21.2-27.0]	
Sex of child					
Male	15.3	9,790	26.7	23.6	1,772
	[14.5-16.7]		[23.8-29.5]	[20.5-26.7]	
Female	13.8	9,681	26.2	24.6	1,558
	12.2-15.6		23.0-29.4	21.1-28.2	
Age Group					
0-5 months	8.8	2,033	18.3	15.9	204
	[7.2-10.3]		[10.8-25.8]	[9.3-22.4]	
6-11 months	21.7	2,115	28.9	27.1	550
	[19.5-23.9]		[24.4-33.4]	[22.2-32.0]	
12-23 months	22.1	3,976	31.4	26.8	988
	[20.3-23.9]		[27.4-35.3]	[23.1-30.1]	
24-35 months	14.5	3,951	25.3	25.2	691
	[13.0-16.0]		[21.3-29.3]	[20.8-29.6]	
36-47 months	11.5	3,859	20.8	19.0	534
	[10.3-12.7]		[17.0-24.7]	[14.7-23.3]	
48-59 months	8.5	3,537	23.6	21.6	363
	[7.4-9.6]		[18.5-28.7]	[16.4-26.9]	
Zone					
North Central	12.9	3,636	26.7	15.9	467
	[11.1-14.7]		[21.3-32.0]	[11.0-20.7]	
North East	15.9	4,274	32.4	42.0	679
	[13.0-18.8]		[27.9-37.0]	[34.1-49.9]	
North West	24.9	5,815	23.6	27.7	1,626
	[22.4-27.3]		[19.5-27.8]	[22.7-32.7]	
South East	16.8	1,643	27.1	14.0	274
	[14.7-18.9]		[21.2-32.9]	[9.1-19.0]	
South South	5.8	2,187	25.5	16.7	140
	[4.7-7.0]		[17.8-33.3]	[9.8-23.6]	
South West	7.0	1,916	30.2	12.5	144
	[5.5-8.6]		[19.2-41.1]	[5.2-19.8]	
State					
Abia	20.2	312	23.8	19.0	63
	[15.6-24.8]		[10.6-37.0]	[6.1-32.0]	
Adamawa	4.7	596	17.9	32.1	28
	[2.5-6.9]		[1.6-34.1]	[12.0-52.3]	
Akwa-Ibom	6.1	392	20.8	20.8	24
	[3.8-8.5]		[2.6-39.1]	[7.7-34.0]	
Anambra	15.2	348	22.6	7.5	53
	[10.9-19.5]		[11.2-34.1]	[0.4-14.7]	
Bauchi	26.0	903	36.6	40.0	235
	[18.9-33.2]		[29.5-43.7]	[27.2-52.8]	
Bayelsa	7.9	355	10.7	7.1	28
	[3.7-12.1]		[0.1-21.9]	[1.7-16.0]	

Table 14:continued

Background Characteristics	Diarrhea in preceding 2 weeks	Total U5s	Treated with ORS	Treated with Zinc	Total U5s with diarrhoea
Benue	8.9	530	23.4	19.1	47
	[5.9-11.9]		[7.9-38.9]	[6.2-32.1]	
Borno	19.4	638	36.3	45.2	124
	[12.0-26.9]		[27.0-45.6]	[28.6-61.7]	
Cross River	6.1	423	34.6	19.2	26
	[3.5-8.8]		[14.1-55.2]	[1.0-37.5]	
Delta	3.8	344	30.8	23.1	13
	[1.6-5.9]		[2.4-59.2]	[1.9-48.1]	
Ebonyi	14.7	395	32.8	15.5	58
	[10.5-18.9]		[20.7-44.8]	[6.2-24.8]	
Edo	11.7	333	25.6	7.7	39
	[8.1-15.3]		[14.8-36.5]	[0.9-16.3]	
Ekiti	8.8	306	14.8	3.7	27
	[5.0-12.7]		[0.2-31.8]	[0.1-10.1]	
Enugu	16.0	282	42.2	20.0	45
	[11.1-20.8]		[29.7-54.7]	[8.2-31.8]	
FCT	15.1	431	40.0	20.0	65
	[8.4-21.7]		[23.6-56.4]	[5.3-34.7]	
Gombe	25.5	812	30.0	52.2	207
	[18.1-32.9]		[21.1-38.8]	[35.9-68.5]	
Imo	18	306	20.0	10.9	55
	[13.4-22.6]		[7.7-32.3]	[1.0-20.8]	
Jigawa	20.4	909	42.2	33.0	185
	[15.4-25.3]		[31.4-52.9]	[17.3-48.7]	
Kaduna	16.3	589	38.5	38.5	96
	[9.5-23.1]		[16.2-60.9]	[13.1-64.0]	
Kano	17.4	838	24.0	29.5	146
	[11.8-23.1]		[14.1-33.8]	[17.6-41.3]	
Katsina	28.5	931	17.0	20.8	265
	[25.4-31.5]		[11.5-22.5]	[13.0-28.5]	
Kebbi	37.4	850	18.9	30.2	318
	[33.0-41.9]		[12.2-25.6]	[21.3-39.1]	
Kogi	16.0	368	10.2	6.8	59
	[10.9-21.2]		[1.8-18.5]	[0.1-14.0]	
Kwara	20.6	433	20.2	9.0	89
	[15.4-25.7]		[10.6-29.8]	[1.2-16.8]	
Lagos	4.2	333	64.3	28.6	14
	[1.6-6.8]		[35.2-3.3]	[6.1-51.1]	
Nasarawa	8.1	508	31.7	14.6	41
	[2.8-13.4]		[20.5-42.9]	[6.4-22.9]	
Niger	16.1	825	36.1	21.1	133
	[11.7-20.6]		[23.1-49.1]	[7.8-34.3]	
Ogun	4.8	394	21.1	15.8	19
	[2.9-6.8]		[2.6-39.5]	[0.4-32.0]	
Ondo	10.2	275	10.7	3.6	28
	[5.0-15.4]		[1.3-20.1]	[0.3-10.5]	
Osun	12.1	248	30.0	16.7	30
	[6.0-18.2]		[12.7-47.3]	[1.0-34.4]	

Table 14:continued

Background Characteristics	Diarrhea in preceding 2 weeks	Total U5s	Treated with ORS	Treated with Zinc	Total U5s with diarrhoea
Oyo	7.2	360	26.9	3.8	26
	[4.2-10.2]		[9.2-44.6]	[0.1-11.4]	
Plateau	6.1	542	33.3	27.3	33
	[3.8-8.3]		[19.0-47.6]	[13.6-40.9]	
Rivers	2.9	340	30.0	30.0	10
	[0.9-5.0]		[3.2-56.8]	[3.2-56.8]	
Sokoto	38.1	833	13.9	20.8	317
	[33.3-42.8]		[8.2-19.6]	10.1-31.6]	
Taraba	6.2	569	17.1	17.1	35
	[2.3-10.0]		[4.4-29.9]	[5.8-28.5]	
Yobe	6.6	756	26.0	42.0	50
	[4.1-9.2]		[13.0-39.0]	[23.8-60.2]	
Zamfara	34.6	865	22.7	27.8	299
	[30.2-38.9]		[16.7-28.7]	[17.8-37.7]	

Acute Respiratory Infection (ARI) and Treatment

Acute respiratory infections (ARI) are a heterogeneous and complex group of diseases that constitute the major causes of mortality and morbidity among under-five children in Nigeria, and globally. Most of these deaths are caused by pneumonia and bronchiolitis. According to a study[50] conducted in Nigeria, the overall incidence of ARI is 6-8 episodes during the first 5 years of life. Timely diagnosis and treatment with antibiotics can prevent a considerable proportion of mortality.

In the NNHS survey, the prevalence of ARI has been estimated by asking mothers (or caretakers) whether the child had had cough accompanied by short, rapid breathing in the two weeks prior to the survey. The estimate is based on mothers' perception and not on a diagnosis by a health professional, therefore this finding needs to be interpreted with caution. Also the prevalence of ARI, as diarrhoea, varies seasonally[51]. The survey estimates are similar to the ones found in NNHS 2015, NNHS 2014, MICS 2016-17 and DHS 2013.

[50]Incidence of acute lower respiratory infections in a low socioeconomic community, Nigerian Journal of Pediatrics 1991

[51]In a study conducted in Kwara State, a correlation between ARI episodes and seasonality was found. On average a child would have three episodes of mild, moderate and severe ARI per year. The peak of infection corresponded to the rainy season (July-November), and a smaller peak to the dry season (February-April). Acute respiratory infections in Nigerian children: prospective cohort study of incidence and case management, Journal of Tropical Pediatrics, 1994

Overall, only 4.6 percent of children under 5 years were reported to have had symptoms of ARI during the two weeks preceding the survey (Table 15). A third (35.5 percent) of these children was given antibiotics, but the percentage of children receiving treatment varied greatly among surveyed states. Children with ARI were more likely to receive antibiotic treatment in South West (64 percent) and South East (54 percent) than in other zones, the lowest being North East where fewer than one in five children received antibiotics. Antibiotics treatment was most prevalent among children age 0-5 months (48 percent) and least prevalent among older children aged 36-47 months (32 percent). Girls and boys were likely to be treated equally with antibiotics (33-38 perecent) implying that boys and girls are receive the same medical attention when they have symptoms of acute respiratory illness.

Table 15: Percent of children under aged 5 years with Acute Respiratory Infection (ARI) in the last two weeks who were given antibiotics by sex, age and zone.

Background Characteristics	Cough	ARI symptoms	Total U5s	Treated with Antibiotics	Number with ARI
National	22.4	4.6	19,471	35.5	999
	[21.2-23.5]	[4.0-5.3]		[30.5-40.6]	
Sex of child					
Male	22.8	4.6	9790	33	501
	[21.5-24.1]	[4.0-5.3]		[27.3-38.7]	
Female	21.9	4.6	9681	38.1	498
	[20.6-23.3]	[3.9-5.4]		[31.5-44.6]	
Age Group					
0-5 months	15.9	4.0	2033	48.3	87
	[13.6-18.1]	[2.8-5.2]		[34.2-62.5]	
6-11 months	25.4	6.8	2115	40.1	147
	[22.9-27.9]	[5.4-8.3]		[30.2-50.1]	
12-23 months	24.7	5.4	3976	31.8	235
	[229-26.5]	[4.4-6.4]		[24.4-39.2]	
24-35 months	23.1	4	3,951	34.7	193
	[21.3-25.0]	[3.2-4.8]		[26.5-43.0]	
36-47 months	23	4.8	3,859	31.6	196
	[21.2-24.8]	[4.0-5.7]		[22.9-40.4]	
48-59 months	20.1	3.4	3,537	35.2	141
	[18.4-21.9]	[2.7-4.1]		[26.1-44.2]	
Zone					
North Central	23.2	3.9	3,636	40.1	124
	[21.1-25.4]	[2.9-4.9]		[29.9-50.3]	
North East	20.7	6.0	4,274	18.8	242
	[17.3-24.0]	[4.0-7.9]		[10.4-27.2]	
North West	22.4	7.3	5,815	29.3	424
	19.6-25.2	5.4-9.3		21.3-37.4	
South East	34.5	4.1	1,643	54.4	79
	31.4-37.5	3.0-5.2		41.3-67.6	
South South	22.8	3.5	2,187	35.5	87
	20.2-25.4	2.6-4.5		23.0-47.9	
South West	15.4	2.1	1,916	64.0	43
	13.2-17.6	1.4-2.9		48.9-79.2	

Malaria

Malaria is endemic in Nigeria, with year round transmission. Plasmodium falciparum is the predominant parasite species. Pregnant women and children are most at risk of malaria transmission and its effects. Malaria in pregnant women is a major risk factor of child death in the first month of life; it causes about 15 percent of maternal anaemia and about 35 percent of preventable low birthweight, which is a leading cause of neonatal mortality[52]. Malaria also contributes to anaemia in children. In Nigeria, the hardest-hit country in Africa, it accounts for 11 percent of maternal mortality and 12-30 percent of mortality in children below 5 years[53]. According to Nigeria Malaria Indicator Survey 2010, four in ten Nigerian children were infected with malaria, and almost half of children aged 6-59 months had moderate to severe anaemia[54].

Among preventive measures, many studies have reported the high effect on reducing mortality due to the use of mosquito nets and particularly insecticide-treated bed nets (ITNs). In order to achieve universal coverage in 2009, Nigeria started the National Malaria Control Strategic Plan (NMCSP)[55] and started afresh a coordinated strategy to deliver 2 nets to every household across the country through a series of stand-alone campaigns to achieve universal coverage. In 2010, the World Bank Booster supported seven states (Kano, Jigawa, Bauchi, Gombe, Anambra, Akwa Ibom, and Rivers) conducted net campaigns, and health workers distributed free nets to households. The aim was to promote net-use in households, especially among pregnant women and children below five years of age. Finally, a new 2014-2020 national strategic plan for malaria control was developed in 2014.

During the NNHS survey, respondents were asked whether they possess any type of mosquito net in their household and, if so, how many. The results indicate that 62.3 percent of households in the in the surveyed households possess at least one mosquito net, similar rates to the 60 percent reported in 2015 and 64.5 percent reported in MICS 2016-17 when the rates had improved compared to NNHS 2014 and MICS 2011, when 53 and 45 percent were reported respectively. As shown in Figure 11, the possession of mosquito nets varies noticeably by domain, from North West, where four households out of five (74.3 percent) possess at least one mosquito net, to South South, where fewer than 50 percent of the households (46.4 percent) possess at least one mosquito net. Six states - Osun (88.5%), Yobe (86.1%), Imo (85.4%), Adamawa (83.9%), Ondo (82.1%), and Jigawa (81.9%) have more than 80 percent of the assessed households with one or more mosquito nets coverage. Bayelsa (32.4%) has the lowest possession of mosquito nets, followed by Delta (35.5%), Lagos (36.2%), Ogun (37.1%) and Enugu (37.3%) in that order.

[52]Malaria continues to threaten pregnant women and children. Washington, DC: Population Reference Bureau; 2001.
[53]Nigeria. Federal Ministry of Health, National Malaria Control Programme. Strategic Plan 2009-2013: "A Road Map for Malaria Control in Nigeria", abridged version. Abuja: Yaliam Press; 2009
[54]Nigeria Malaria Indicator Survey, Nigeria 2010.
[55]NMCSP targets are basically three: at least 80 percent coverage for effective case management for Children under five years; at least 80 percent coverage of population at risk sleeping under an Insecticide treated net (ITN); and 90 percent coverage for Intermittent Preventive treatment for pregnant women.

Household Ownership of at least one one mosquito net by Zone (2014, 2015, 2018)

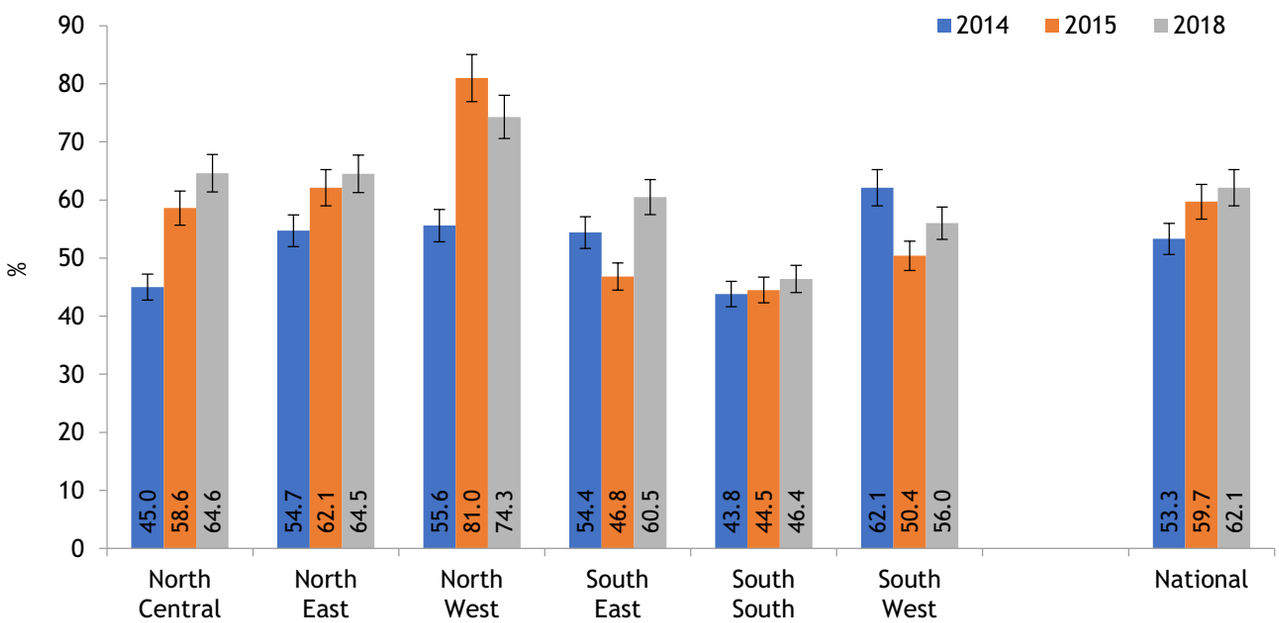

Figure 11: Percent of households with at least one mosquito net by zone (2014, 2015 and 2018)

Significant improvements were noted in Adamawa, Benue, Edo, Ebonyi, Kwara, Osun, Ondo, FCT, Imo, Yobe and Zamfara states in relation to mosquito net ownership compared to 2015 results. However, reductions in coverage were recorded in mosquito net ownership in Akwa-Ibom, Anambra, Bauchi, Ekiti, Gombe, Kaduna, Niger, Lagos and Plateau.

The custom of protecting children, by having them sleep under a mosquito nets, is still low. Whereas 62 percent of the surveyed households possess a mosquito net, only 38 percent of children slept under them. In 2015, a similar proportion of 40 percent children slept under mosquito net and ownership of at least one mosquito net was 60 percent. Figure 12 compares the proportions of children under age 5 slept under any net on the night before the interview in 2018, 2015 and in 2014. At regional level, improvements were reported in the South East and South West zones, where rates however are still below 40 percent. The drop in North East and North Central could be due to seasonal variation in use of mosquito net; the survey took place during the dry season in the northern zones, unlike in 2015 round which was conducted during the rainy season. The use of mosquito nets is seasonal and the peak malaria transmission season in Northern states is usually between June and September. The rates however remain higher compared to 2014 survey also conducted in dry season, indicating some programmatic improvement.

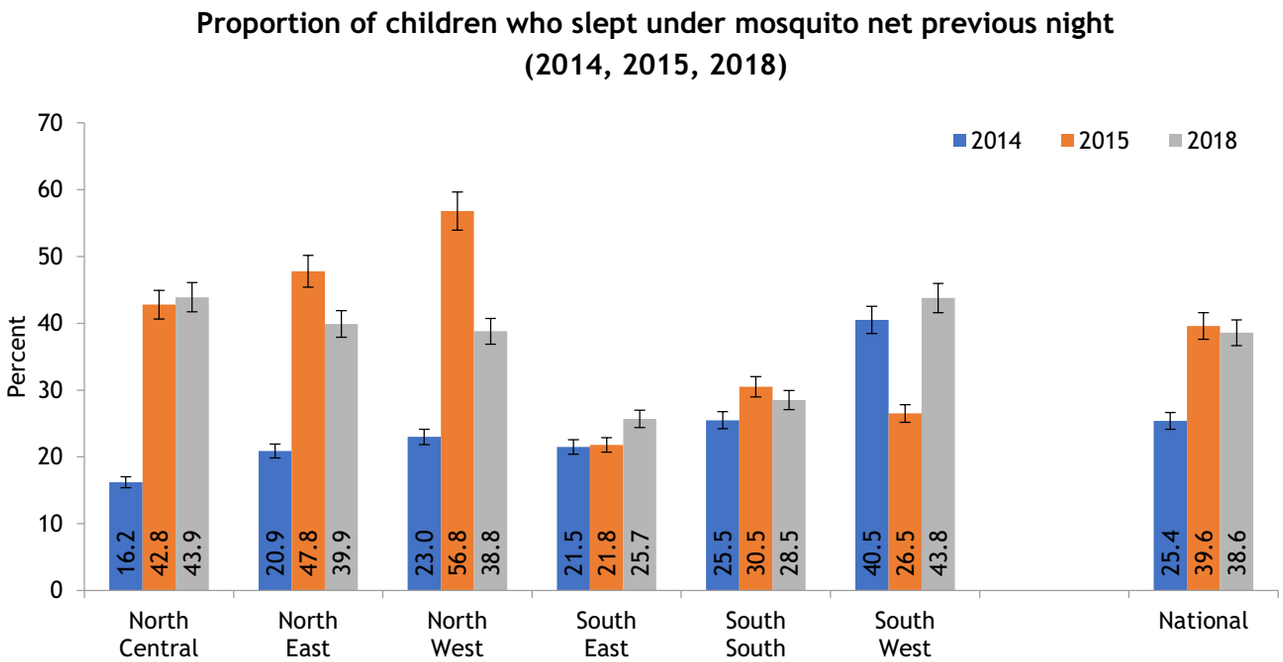

Figure 12: Percent of under 5 children that slept under a mosquito net the night before the survey by zone (2014, 2015 and 2018)

At state level, Imo (74 percent), Osun (71 percent) and Ondo (68 percent) recorded some of the highest rates of net ownership, while the lowest percentages were found in Taraba (15 percent), Lagos (16 percent), Delta and Ogun (17 percent) in that order (Table 16). Net use among the children under five years was highest in Yobe (77 percent), Osun (64 percent), and Ondo (61 percent) and lowest in Sokoto (19 percent), Taraba and Enugu (20 percent). In many of the states, the ownership of mosquito net did not match use by the children under five years of age. One reason for this discrepancy, as postulated by several studies, could be the lack of educational campaigns accompanying nets distributions[56]. These strategies provide knowledge on the importance of nets and help to demonstrate the proper use of nets immediately following mass distribution. The involvement of communities in malaria control is very important since it helps dealing with several complex questions about the perceptions of the disease, its causes, prevention, and control[57]. Post distribution educational campaign should therefore be incorporated into future distribution campaigns to help increase net utilization.

[56]Ownership and utilisation of long lasting insecticide treated nets following free distribution campaign in South West Nigeria, Pan African Medical Journal, 2014.
[57]Sleeping under Insecticide-treated Nets to Prevent Malaria in Nigeria: What Do We Know? Health and Population Nutrition Journal, 2013.

Table 16: Percent of households with at least one mosquito net and children age 0-59 months who slept under a mosquito net the night before the survey, by background characteristics

Background Characteristics	Households with at least one mosquito nets	Households with at least one mosquito nets for every two people	Total HHs	Children under age 5 years who slept under a mosquito net	Total U5s
National	62.1	34.2	24,857	37.1	19,471
	[60.6-63.7]	[32.9-35.5]		[35.2-39.0]	
Zone					
North Central	64.6	36.5	4,486	42.3	3,636
	[61.3-67.9]	[32.9-38.4]		[37.9-46.7]	
North East	64.5	33.5	4,022	38.4	4,274
	[60.8-68.2]	[28.6-35.4]		[33.7-43.1]	
North West	74.3	34.1	4,767	39	5,815
	[71.5-77.1]	[30.4-34.9]		[34.4-43.7]	
South East	60.5	41.1	3,363	26.1	1,643
	[56.7-64.3]	[38.7-46.7]		[22.6-29.7]	
South South	46.4	27.6	4,093	28.5	2,187
	[43.4-49.4]	[24.7-29.6]		[24.6-32.3]	
South West	56.0	41.3	4,126	42.7	1,916
	[52.2-59.8]	[33.1-40.7]		[38.3-47.1]	
State					
Abia	56.9	36.1	654	31.4	312
	[49.3-64.5]	[29.7-42.5]		[21.4-41.4]	
Adamawa	83.9	56.3	671	49.0	596
	[77.7-90.1]	[49.0-63.7]		[34.6-63.4]	
Akwa-Ibom	49.9	28.1	704	30.9	392
	[45.0-54.7]	[23.9-32.3]		[21.4-40.3]	
Anambra	53.7	35.9	668	23.0	348
	[47.6-59.9]	[30.4-41.5]		[16.8-29.1]	
Bauchi	61.8	25.7	693	24.9	903
	[56.1-67.5]	[20.2-31.1]		[18.5-31.4]	
Bayelsa	32.4	19.1	676	20.6	355
	[25.9-38.9]	[14.1-24.1]		[13.4-27.8]	
Benue	74.2	40.4	623	50.4	529
	[69.0-79.3]	[35.5-45.4]		[41.3-59.7]	
Borno	55.2	23.3	683	34.6	638
	[44.6-65.8]	[16.3-30.3]		[24.4-44.9]	
Cross River	51.2	30.5	701	34.0	423
	[43.4-59.1]	[24.1-37.0]		[26.4-41.7]	
Delta	35.5	16.7	671	22.1	344
	[29.7-41.7]	[13.0-20.4]		[15.2-29.0]	
Ebonyi	66.9	41.5	689	30.1	395
	[58.7-75.1]	[34.7-48.3]		[23.9-36.4]	
Edo	70.2	50.9	645	40.5	333
	[64.1-76.4]	[44.6-57.1]		[30.4-50.7]	
Ekiti	43.3	30.2	688	20.9	306
	[37.8-48.9]	[24.8-35.7]		[15.1-26.7]	
Enugu	37.3	19.3	694	19.9	282
	[31.5-43.1]	[14.7-23.9]		[13.5-26.2]	
FCT	48	20.7	617	36.0	431
	[41.9-54.0]	[16.2-25.3]		[26.2-45.8]	
Gombe	57	20.9	683	33.3	812
	[48.1-65.8]	[16.2-25.7]		[26.0-40.5]	
Imo	85.4	74.0	658	28.8	306
	[81.6-89.2]	[68.7-79.3]		[20.4-37.1]	
Jigawa	81.9	37.4	681	50.1	909
	[75.8-88.1]	[31.3-43.6]		[38.2-61.9]	

Table 16: continued

Background Characteristics	Households with at least one mosquito nets	Households with at least one mosquito nets for every two people	Total HHs	Children under age 5 years who slept under a mosquito net	Total U5s
Kaduna	61.3	23.8	618	24.3	589
	[53.8-68.8]	[18.4-29.2]		[14.7-33.8]	
Kano	74	31.4	669	59.4	838
	[68.4-79.6]	[27.5-35.3]		[51.0-67.8]	
Katsina	76.5	29.4	701	26.7	931
	[69.7-83.2]	[23.4-35.4]		[18.3-35.2]	
Kebbi	79.3	34.7	714	49.4	850
	[71.6-87.0]	[28.0-41.4]		[37.4-61.4]	
Kogi	67.7	42.7	623	36.4	368
	[59.9-75.6]	[36.1-49.3]		[26.3-46.6]	
Kwara	73.8	54.6	663	33.3	433
	[67.2-80.3]	[47.5-61.7]		[22.7-43.8]	
Lagos	36.2	16.1	696	30.9	333
	[31.4-41.0]	[12.9-19.2]		[23.6-38.2]	
Nasarawa	78.6	49.3	607	58.1	508
	[68.4-88.7]	[38.3-60.2]		[47.7-68.5]	
Niger	64.1	26.1	686	46.1	825
	[54.6-73.6]	[20.6-31.6]		[33.3-58.8]	
Ogun	37.1	17.4	703	28.9	394
	[30.4-43.8]	[12.5-22.2]		[20.3-37.6]	
Ondo	82.1	67.8	665	60.7	275
	[76.0-88.2]	[60.9-74.4]		[53.2-68.2]	
Osun	88.5	71	687	63.7	248
	[85.5-91.6]	[64.2-77.9]		[55.8-71.6]	
Oyo	69.9	46.7	687	56.1	360
	[64.3-75.5]	[41.0-52.5]		[46.1-66.1]	
Plateau	46.5	22.9	667	34.9	542
	[38.4-54.6]	[17.1-28.8]		[26.0-43.8]	
Rivers	40.2	21.4	696	24.1	340
	[34.5-46.0]	[17.1-25.7]		[15.1-33.1]	
Sokoto	75.1	44.8	692	19.0	833
	[66.7-83.6]	[37.7-51.9]		[9.9-28.1]	
Taraba	38.6	15.4	625	20.7	569
	[29.8-47.3]	[8.8-22.0]		[11.0-30.5]	
Yobe	86.1	48.4	667	76.6	756
	[79.1-93.0]	[39.6-57.3]		[69.0-84.2]	
Zamfara	79	36.3	692	26.5	865
	[73.2-84.9]	[30.0-42.6]		[18.1-34.9]	

Antimalarial Treatment for Children

Fever is a major manifestation of many acute infections in children, of which malaria is among. Since malaria is endemic in Nigeria, the presence of fever should always be regarded with attention, especially after the end of the rainy season, when malaria is most prevalent[58]. In 2010 the World Health Organization started recommending universal use of diagnostic testing to confirm malaria infection and apply appropriate treatment based on the results. According to the guidelines, treatment solely on the basis of clinical suspicion should only be considered when a parasitological diagnosis is not accessible. Children with severe malaria symptoms, such as fever or convulsions, should be taken to a health facility and subjected to diagnostic testing.

In the context of the NNHS survey, mothers (or caregivers) were asked whether their children under age 5 had fever in the two weeks before the survey. If fever was reported, mothers (or caregivers) were asked if a blood sample was taken, and if positive, whether the child had been given any antimalarial drugs, in particular Artemisinin-based Combination Therapy (ACT) (or other first line treatment according to the national policy).

Overall, 4,418 under five children (21.5 percent of all children) were reported to have had fever in the two weeks before the survey. Fever prevalence was highest in the South East, South South and North West zones (29.5, 27.3 and 26.6 percent respectively) – where malaria is predominant – and lowest in South West, North East and North Central (<20 percent). Fever prevalence also peaked in the 12-23 age group (27 percent), while it was less frequent in children below six months of age (10 percent).

Despite the consistently high number of children affected by fever (more than 20 percent) and WHO recommendations – only 13 percent of them were reported to have been tested from a finger or a heel with Rapid Diagnostic Testing (RDT). Table 17 shows that the highest proportions of children tested were found in South West (17 percent) zone; while the lowest proportions were tested in North West, South East and South South zones (12 percent). At state level, most of the RDT tests occurred in Osun, FCT and Enugu (23 percent) and much fewer were tested in Oyo, Abia and Adamawa (5 percent).

[58]While fever can occur year round, malaria is more prevalent after the end of the rainy season. For this reason, temporal factors must be taken into account when interpreting fever as an indicator of malaria prevalence.

Prompt treatment of fever is another indicator used to measure the quality of case management. The results of the survey indicate that of all the children under age 5 who had a fever during the two weeks preceding the interview, 41 percent were given an anti-malarial treatment – but only 17 percent received artemisinin combination therapies (ACTs), which should be the first line treatment for malaria. On the other hand almost 25 percent were given antibiotics.

Antimalarial treatment was more prevalent in the South West zone – where 57 percent of children with fever were treated for malaria, 35 percent of which was with ACT – and less prevalent in the North Central, where only 34 percent of children with fever received an antimalarial treatment, 12 percent being ACT. In addition, ACT treatment is not in significant use in Plateau, Zamfara, Sokoto, Taraba, Kano and Katsina (less than 5 percent), despite the endemic malaria in these states.

Generally, the use of antimalarial treatment (including ACT) tends to increase as the child gets older, from 24 percent for children with less than 6 months to over 45 percent for children above 4 years of age, while antibiotic treatment is quite stable, around 34-42 percent for all ages. No significant difference was noted between boys and girls receiving appropriate antimalarial drugs.

In conclusion, despite national malaria prevention programs having an impact and some progress being achieved, the proportion of children who received first line treatment is still severely below the national target – at least 80 percent by 2010, as specified in the National Malaria Strategic Plan.

Table 17: Children with fever in the last two weeks that had blood finger testing, and/or were given an anti-malarial drug, ACT or antibiotics by background characteristics

Background Characteristics	Child had fever in previous 2 weeks		Children with a fever in the last two weeks who were:				
	%	Total U5s	Tested for Malaria (RDT)	Treated with any antimalarial	Treated with ACT	Given antibiotics	Total U5 Children with fever
National	21.5	19,471	12.9	41.0	17.0	25.4	4,418
	[20.4-22.6]		[11.6-14.2]	[38.5-43.5]	[14.9-19.1]	[23.6-27.7]	
Zone							
North Central	18.6	3636	15.1	34.3	11.9	30.1	692
	[16.8-20.5]		[11.7-18.4]	[29.8-38.8]	[8.5-15.2]	[25.1-35.0]	
North East	18.0	4,274	12.5	42.3	15.8	34.8	749
	[15.6-20.4]		[8.9-16.1]	[36.9-47.8]	[11.0-20.6]	[29.9-39.8]	
North West	26.6	5,815	11.7	35.7	8.0	24.9	1,653
	[24.2-29.0]		[9.6-13.9]	[31.1-40.3]	[4.4-11.5]	[21.9-28.0]	
South East	29.5	1643	11.7	47.1	26.2	22.6	499
	[26.5-32.6]		[8.5-14.8]	[41.3-52.8]	[20.6-31.8]	[18.0-27.3]	
South South	27.3	2,187	12.3	40.5	19.7	21.6	603
	[24.6-30.0]		[9.0-15.6]	[34.7-46.4]	[15.2-24.2]	[17.4-25.9]	
South West	10.2	1,916	17.2	57.2	34.5	22.9	222
	[8.2-12.2]		[11.9-22.5]	[48.9-65.6]	[26.3-42.7]	[14.9-30.9]	
Age							
0-5 Months	10.1	2,033	11.4	23.8	6.3	25.6	217
	[8.4-11.7]		[6.6-16.2]	[17.0-30.6]	[2.4-10.1	[19.4-31.9]	
6-11 Months	25.1	2,115	11.3	33.6	10.4	25.5	575
	[22.7-27.4]		[8.4-14.3]	[29.0-38.1]	[7.4-13.4]	[21.5-29.6]	
12-23 Months	26.9	3,976	14.4	40.4	16.3	27.7	1,144
	[25.0-28.8]		[12.0-16.8]	[36.6-44.3]	[13.2-19.4]	[24.3-31.1]	
24-35 Months	21.4	3,951	14.2	44.0	18.2	26.0	916
	[19.9-23.0]		[11.6-16.7]	[39.9-48.1]	[14.8-21.5]	[22.5-29.4]	
36-47months	22.2	3,859	11.0	42.2	19.7	23.2	883
	[20.5-24.0]		[8.7-13.3]	[38.3-46.2]	[16.3-23.1]	[19.9-26.4]	
48-59 Months	19.1	3,537	12.8	47.4	21.4	24.0	683
	[17.4-20.7]		[9.9-15.7]	[42.6-52.2]	[17.3-25.6]	[20.4-27.6]	
State							
Abia	42.9	312	5.2	45.5	30.6	20.1	134
	[35.5-50.4]		[0.1-10.3]	[35.7-55.3]	[19.4-41.8]	[12.6-27.7]	
Adamawa	12.8	596	5.3	13.2	0	59.2	76
	[7.2-18.3]		[0.0-10.7]	[7.4-18.9]	[0.0-0.0]	[40.3-78.1]	
Akwa-Ibom	28.6	392	13.4	32.1	8.9	12.5	112
	[22.5-34.7]		[7.6-19.2]	[17.3-47.0]	[3.0-14.9]	[6.1-18.9]	
Anambra	19.0	348	10.6	37.9	7.6	31.8	66
	[13.2-24.7]		[4.1-17.2]	[23.7-52.1]	[1.1-14.0]	[23.5-40.1]	
Bauchi	26.9	903	14.8	46.9	15.2	26.7	243
	[21.5-32.3]		[7.-21.9]	[38.9-54.9]	[7.2-23.3]	[21.0-32.5]	
Bayelsa	33.2	355	5.9	23.7	10.2	16.1	118
	[26.3-40.2]		[2.8-9.1]	[12.6-34.9]	[1.8-185]	[9.0-23.2]	
Benue	12.3	529	15.4	49.2	27.7	20.0	65
	[8.6-16.0]		[5.2-25.5]	[34.2-64.2]	[14.0-41.4]	[7.8-32.2]	

Table 17: continued

Background Characteristics	Child had fever in previous 2 weeks		Children with a fever in the last two weeks who were:				
	%	Total U5s	Tested for Malaria (RDT)	Treated with any antimalarial	Treated with ACT	Given antibiotics	Total U5 Children with fever
Borno	20.7	638	18.2	60.6	28.8	32.6	132
	[15.9-25.5]		[8.9-27.5]	[47.8-73.5]	[16.3-41.3]	[22.3-42.8]	
Cross River	30.7	423	16.2	42.3	24.6	14.6	130
	[24.1-37.3]		[6.7-25.6]	[29.4-55.2]	[14.5-34.8]	[[7.4-21.8]	
Delta	24.1	344	10.8	41.0	9.6	30.1	83
	[18.4-298]		[0.9-20.7]	[27.9-54.0]	[3.9-15.3]	[20.4-39.8]	
Ebonyi	31.4	395	15.3	53.2	33.9	15.3	124
	[26.0-36.8]		[9.1-21.6]	[44.0-62.5]	[23.6-44.1]	[8.4-22.3]	
Edo	15.6	333	26.9	65.4	50.0	36.5	52
	[10.7-20.6]		[13.8-40.1]	[49.1-81.7]	[49.1-81.7]	[31.3-68.7]	
Ekiti	18.6	306	17.5	40.4	17.5	26.3	57
	[11.9-25.3]		[7.2-27.9]	[24.1-56.6]	[6.4-28.7]	[15.8-36.9]	
Enugu	28	282	22.8	35.4	15.2	31.6	79
	[21.1-35.0]		[12.7-32.9]	[21.9-49.0]	[6.7-23.7]	[17.6-45.7]	
FCT	26.7	431	22.6	43.5	17.4	29.6	115
	[19.7-33.7]		[12.3-32.9]	[30.2-56.7]	[10.1-24.7]	[13.0-46.1]	
Gombe	22.8	812	9.7	48.6	23.2	30.3	185
	[17.4-28.1]		[6.3-13.2]	[37.2-60.1]	[10.7-35.8]	[23.5-37.0]	
Imo	31.4	306	8.3	59.4	37.5	16.7	96
	[25.8-37.0]		[3.6-13.1]	[49.0-69.7]	[25.6-49.4]	[7.1-26.3]	
Jigawa	22.8	909	20.8	51.7	21.7	31.4	207
	[18.0-27.5]		[14.0-27.5]	[41.7-61.7]	[9.1-34.4]	[23.1-39.7]	
Kaduna	22.1	589	10.8	66.9	20.8	27.7	130
	[15.0-29.2]		[3.5-18.0]	[56.3-77.5]	[1.9-39.7]	[18.1-37.2]	
Kano	22.1	838	11.9	26.5	3.8	24.3	185
	[16.2-27.9]		[6.6-17.1]	[17.4-35.6]	[0.7-6.9]	[16.6-32.0]	
Katsina	29.9	931	9.0	19.8	4.7	20.9	278
	[25.4-34.3]		[4.3-13.6]	[12.3-27.2]	[1.9-7.4]	[13.3-28.4]	
Kebbi	39.6	850	11.9	24.0	6.5	24.3	337
	[35.4-43.8]		[8.3-15.4]	[18.2-29.9]	[3.0-10.1]	[17.2-31.5]	
Kogi	19.3	368	14.1	43.7	12.7	29.6	71
	[16.0-22.6]		[5.3-22.8]	[31.5-55.8]	[2.7-22.7]	[19.0-40.1]	
Kwara	23.6	433	8.8	42.2	5.9	25.5	102
	[18.6-28.5]		[2.3-15.3]	[30.1-54.2]	[1.5-10.3]	[16.2-34.8]	
Lagos	6.0	333	15.0	75.0	55.0	40.0	20
	[3.1-8.9]		[0.1-29.9]	[52.5-97.5]	[29.8-80.2]	[11.9-68.1]	
Nasarawa	16.1	508	11.0	9.8	0	58.5	82
	[10.6-21.7]		[3.8-18.1]	[2.2-17.4]	[0.0-0.0]	[40.2-76.9]	
Niger	23.5	825	18.0	25.3	10.8	26.8	194
	[18.7-28.3]		[10.9-25.2]	[16.9-33.6]	[4.1-17.5]	[19.6-34.1]	
Ogun	7.4	394	13.8	72.4	41.4	13.8	29
	[4.4-10.4]		[0.0-29.0]	[53.4-91.5]	[22.1-60.6]	[0.4-27.2]	
Ondo	17.1	275	21.3	48.9	27.7	10.6	47
	[10.1-24.1]		[13.0-29.5]	[32.4-65.5]	[13.9-41.4]	[1.6-19.7]	
Osun	19.0	248	23.4	48.9	21.3	21.3	47
	[11.5-26.4]		[10.5-36.3]	[32.7-65.2]	[9.4-33.2]	[6.8-35.7]	

Table 17: continued

Background Characteristics	Child had fever in previous 2 weeks		Children with a fever in the last two weeks who were:				
	%	Total U5s	Tested for Malaria (RDT)	Treated with any antimalarial	Treated with ACT	Given antibiotics	Total U5 Children with fever
Oyo	6.1	360	4.5	68.2	54.5	22.7	22
	[3.7-8.6]		[0.0-13.4]	[43.0-93.3]	[31.6-77.4]	[4.0-41.5]	
Plateau	11.6	542	7.9	12.7	0	38.1	63
	[8.5-14.8]		[0.0-15.8]	[3.9-21.5]	[0.0-0.0]	[24.5-51.7]	
Rivers	31.8	340	8.3	43.5	25.0	24.1	108
	[25.4-38.1]		[3.1-13.5]	[31.6-55.4]	[14.6-35.4]	[14.1-34.1]	
Sokoto	29.9	833	9.6	34.5	1.6	22.9	249
	[26.0-33.8]		[4.5-14.8]	[25.6-43.5]	[0.0-4.0]	[16.9-28.9]	
Taraba	10.9	569	9.7	17.7	3.2	51.6	62
	[7.1-14.7]		[2.0-17.3]	[7.7-27.8]	[0.0-7.8]	[33.3-69.9]	
Yobe	6.7	756	9.8	43.1	17.6	35.3	51
	[4.7-8.8]		[2.7-16.9]	[28.7-57.6]	[5.5-29.8]	[25.0-45.6]	
Zamfara	30.9	865	10.5	41.6	0.7	26.2	267
	[26.2-35.5]		[6.1-14.9]	[31.8-51.4]	[0.0-1.8]	[19.4-33.0]	

Intermittent Preventive Treatment for Malaria in pregnant women

Estimates of malaria parasitaemia in Nigerian pregnant women vary greatly among geographic regions. In 2015, hospital-based prevalence ranged from 5 percent in the North West, 17 percent in the South West, to 95 percent in the South East region where Nigeria borders the Gulf of Guinea[59]. Intermittent preventive treatment of malaria parasitemia with an antimalarial drug during pregnancy such as sulphadoxine-pyrimethamine (SP)/Fansidar is a cost-effective means of preventing malaria in pregnancy, and reduces placental infection, anaemia, and low birth weight babies[60].

In 2001, the Federal Ministry of Health in Nigeria in its National Strategic Plan for the control of malaria recommended early case management against the adverse consequences of malaria in pregnancy: two doses of SP during the second trimester and early in the third trimester of pregnancy; and a third dose for pregnant women who were HIV positive[61]. In accordance with current national guidelines, SP is given free of charge to pregnant women attending antenatal care clinics services in public health facilities and nongovernmental organizations. However, more than a decade after the policy recommendation, studies in many parts of Nigeria still indicate low coverage of intermittent preventive treatment of malaria in pregnancy (IPTp) use during

[59]EPopulation based prevalence of malaria among pregnant women in Enugu State, Nigeria: the Healthy Beginning Initiative. Malaria Journal 2015.
[60]World Health Organisation. Roll Back Malaria Factsheet No.94. Geneva, 2001.
[61]Strategic Plan for Rolling Back Malaria in Nigeria 2001-2005. Abuja, Nigeria: Federal Ministry of Health; 2001. Federal Ministry of Health

pregnancy[62]. The 2016-17 Nigeria Malaria Indicator Survey reported that 15 per cent of women who had given birth in the two years preceding the survey had received even one dose of SP during their ANC visits, less than a third of those who attended ANC with a skilled health personel (66 percent). Overall, only 9 percent of women who had live birth during the two years preceding the survey took SP/Fansidar three or more times during ANC as recommended (Table 18), a slight increase from 6 percent in 2015. The percentage was only slightly higher for older women, as compared to teenagers (9.0 versus 8.4 percent) and coverage of this intervention was highest in the South West (12 percent) and lowest in the South South (7 percent). At state level, the highest percentage was reported in Edo, where 19 percent of pregnant women received SP/Fansidar three or more times during ANC. Conversely, the lowest percentage was reported in Bayelsa, where only three percent of pregnant woman received recommended preventive treatment[63].

[62]Knowledge and utilization of intermittent preventive treatment for malaria among pregnant women attending antenatal clinics in primary health care centers in rural southwest, Nigeria: a cross-sectional study. BMC Pregnancy Childbirth, 2009.

[63]Reasons for such a low coverage could be related to systems-based challenges (stockouts; lack of provider knowledge of IPTp protocols) coupled with individual women's beliefs and lack of understanding of the IPT contribute. Many pregnant women are still reluctant to seek care for an illness they do not have. In addition, those with malaria often prefer to self-medicate through drug shops or herbs, though those who seek clinic-based treatment trust their providers and willingly accept medicine prescribed. Perceptions of intermittent preventive treatment of malaria in pregnancy (IPTp) and barriers to adherence in Nasarawa and Cross River States in Nigeria, Malaria Journal 2013.

Table 18: Intermittent preventive treatment for malaria in pregnant women (15-49) during an ANC visits

Background Characteristics	Percentage of women with live birth in the last two years who took medicines during an ANC visit to prevent malaria			
	At least one medicine	SP/ Fansidar	3 or more doses of SP/Fansidar during ANC	Women (15-49 years) with live birth in last 2 years
National	59.3	29.7	8.9	8,329
	[57.1-61.5]	[27.6-31.8]	[8.0-9.9]	
Zone				
North Central	61.0	23.3	7.6	1,543
	[56.7-65.4]	[19.8-26.8]	[5.9-9.2]	
North East	63.3	23.8	10	1,800
	[58.1-68.4]	[18.9-28.7]	[7.5-12.6]	
North West	49.4	22.0	8.6	2,663
	[44.7-54.1]	[18.4-25.7]	[6.8-10.4]	
South East	62.9	34.2	7.5	645
	[57.9-67.9]	[29.5-38.9]	[5.3-9.8]	
South South	64.5	33.8	7.3	932
	[60.0-69.0]	[28.1-39.5]	[5.1-9.5]	
South West	70.3	53.9	12.2	746
	[65.9-74.7]	[49.0-58.8]	[9.1-15.2]	
Age				
15-19 Years	52.2	25.2	8.4	654
	[47.4-57.1]	[20.8-29.6]	6.0-10.8]	
20-49 Years	59.9	30.0	9.0	7675
	[57.6-62.1]	[27.9-32.1]	[8.0-10.0]	
State				
Abia	52.8	22.8	7.1	127
	[44.6-60.9]	[14.4-31.2]	[1.8-12.4]	
Adamawa	70.2	12.7	5.8	275
	[56.2-84.2]	[6.0-19.4]	[1.7-9.9]	
Akwa-ibom	66.7	35.8	5.6	162
	[56.7-76.7]	[22.1-49.5]	[1.8-9.3]	
Anambra	60.6	27.3	6.1	132
	[50.5-70.7]	[17.2-37.3]	[2.4-9.7]	
Bauchi	61.6	31.6	13.0	370
	[50.4-72.9]	[19.9-43.4]	[7.4-18.6]	
Bayelsa	38.4	13.2	2.6	151
	[26.6-50.3]	[4.4-22.1]	[0.2-5.1]	
Benue	36.2	26.8	5.6	213
	[27.2-45.1]	[19.1-34.4]	[2.4-8.9]	
Borno	66.7	17.6	7.3	273
	[53.7-79.6]	[6.8-28.4]	[3.2-11.5]	
Cross river	71.6	39.6	5.6	197
	[59.8-83.3]	[24.0-55.2]	[2.6-8.6]	
Delta	67.8	30.1	4.8	146
	[58.4-77.2]	[17.4-42.9]	[0.7-8.8]	
Ebonyi	65.0	46.5	14.0	157
	[55.0-74.9]	[38.4-54.6]	[8.1-19.9]	
Edo	53.1	40.6	18.8	128
	[41.7-64.6]	[30.3-50.9]	[8.9-28.6]	
Ekiti	59.5	23.0	4.8	126
	[49.0-70.0]	[12.5-33.5]	[0.6-8.9]	

Table 18: continued

Background Characteristics	Percentage of women with live birth in the last two years who took medicines during an ANC visit to prevent malaria			
	At least one medicine	SP/ Fansidar	3 or more doses of SP/Fansidar during ANC	Women (15-49 years) with live birth in last 2 years
Enugu	69.0	52.6	6.9	116
	[54.9-83.1]	[39.9-65.3]	[1.4-12.4]	
FCT	81.6	38.9	14.2	190
	[69.9-93.3]	[25.0-52.9]	[8.9-19.6]	
Gombe	69.8	29.6	15.7	331
	[59.4-80.1]	[18.6-40.7]	[6.9-24.5]	
Imo	67.3	29.2	6.2	113
	[56.0-78.5]	[23.1-35.3]	[1.2-11.2]	
Jigawa	65.5	37.9	15.2	409
	[54.9-76.2]	[26.3-49.5]	[9.2-21.1]	
Kaduna	62.4	33.2	13.6	250
	[53.4-71.4]	[23.0-43.4]	[8.1-19.1]	
Kano	65.1	15.4	6.6	350
	[53.2-77.1]	[8.7-22.2]	[3.1-10.0]	
Katsina	34.3	17.6	5.9	443
	[26.0-42.7]	[9.9-25.3]	[2.9-8.9]	
Kebbi	46.4	26.8	11	392
	[37.5-55.3]	[17.3-36.2]	[4.3-17.6]	
Kogi	72.4	29.7	9.0	145
	[62.4-82.5]	[19.0-40.3]	[4.3-13.7]	
Kwara	61.0	16.4	5.6	177
	[50.7-71.4]	[8.7-24.1]	[2.7-8.6]	
Lagos	75.9	66.4	16.1	137
	[67.2-84.7]	[55.1-75.8]	[8.4-23.7]	
Nasarawa	78.7	24.5	16.2	216
	[71.5-85.9]	[12.8-36.3]	[7.4-25.0]	
Niger	64.9	21.3	5.5	362
	[57.5-72.3]	[14.4-28.1]	[2.3-8.7]	
Ogun	72.8	66.9	13.2	136
	[61.8-83.8]	[56.2-77.6]	[6.6-19.9]	
Ondo	55.1	24.6	6.8	118
	[44.4-65.8]	[15.5-33.7]	[1.6-12.0]	
Osun	76.1	37.5	11.4	88
	[65.3-86.9]	[22.9-52.1]	[3.8-19.0]	
Oyo	71.6	65.2	12.8	141
	[62.0-81.3]	[56.4-74.1]	[7.3-18.2]	
Plateau	55.0	10.8	4.6	240
	[43.1-66.9]	[3.6-18.1]	[0.9-8.3]	
Rivers	72.3	35.1	6.8	148
	[63.6-81.0]	[21.3-49.0]	[2.2-11.4]	
Sokoto	31.1	15.7	4.6	370
	[20.9-41.3]	[6.7-24.6]	[1.4-7.8]	
Taraba	60.7	10.3	3.8	234
	[48.9-72.5]	[5.0-15.5]	[0.8-6.9]	
Yobe	52.1	29.3	9.8	317
	[40.5-63.6]	[16.8-41.9]	[3.6-15.9]	
Zamfara	23.8	15.4	6.5	449
	[16.3-31.4]	[8.8-21.9]	[3.1-9.8]	

Women Nutrition

Adequate nutrition, a fundamental cornerstone for any individual, is especially critical in the case of women because malnutrition has important implications for their health as well as their children's health. Women malnutrition results in increased susceptibility to infections, slow recovery from illness, and a heightened risk of adverse pregnancy outcomes – pre-term, birth and intra-uterine growth retardation, obstructed labour, low birth weight, low quality breast milk, postpartum haemorrhage, and increased morbidity for both herself and her baby. On the other hand, children of malnourished women are more likely to face cognitive impairments, short stature, lower resistance to infections, and a higher risk of disease and death[64].

In the NNHS survey, the nutritional status of women was assessed using MUAC[65]. Commonly used as an indicator of child malnutrition and wasting, the MUAC can be used as an indicator of maternal nutritional status because of its high correlation with maternal weight and body mass index. Increases of MUAC during pregnancy are generally less than 5 mm, therefore it can be used to define under nutrition also in pregnant women. In this survey, and for comparisons with other NNHS surveys, women with MUAC < 221 mm were classified as acutely malnourished, while women whose MUAC was between 214 and 221 mm were classified as moderately malnourished and women whose MUAC fell below 214 mm were classified as severely malnourished.

Overall, 24,985 women in reproductive age group (15-49 years) were surveyed in the 37 domains, 11 percent of which were found pregnant. A comparison with 2014 and 2015 show a decreasing trend in the number of pregnant women in the child bearing age from 16 and 14 percent respectively (Fig. 13). These percentages are most likely to be underestimated as often women do not know or do not want to report their physiological status until the pregnancy is conspicuous enough. The majority of pregnant women were found in the Northern regions, and particularly in the North East and North West, where 14 percent of the women were pregnant. In addition, half (6.1 percent) as much of those pregnant were found among the teenage women (15-19 years) compared to the older women (12.3 percent). It must be noted that child bearing early in life carries significant risks for young people, particularly in rural areas where women do not complete their growth until around the age of 20 years.

[64]ERansom Elder, Nutrition of Women and Adolescent Girls: Why It Matters, Population Reference Bureau, 2003
[65]Currently there is neither consensus on which anthropometric measurement should be used to identify acute malnutrition during pregnancy nor which cut-off value should be used. Some programs use the normal body mass index (BMI) cut-off value of 18.5 kg/m2 for adult women. Mid-upper arm circumference (MUAC) is often used too, but no universal cut-off points have been identified. The guidelines state that cut-off points for risk vary by country and range from 18 cm to 23 cm. Which Anthropometric Indicators Identify a Pregnant Woman as Acutely Malnourished and Predict Adverse Birth Outcomes in the Humanitarian Context? PLoS Currents, June 2013

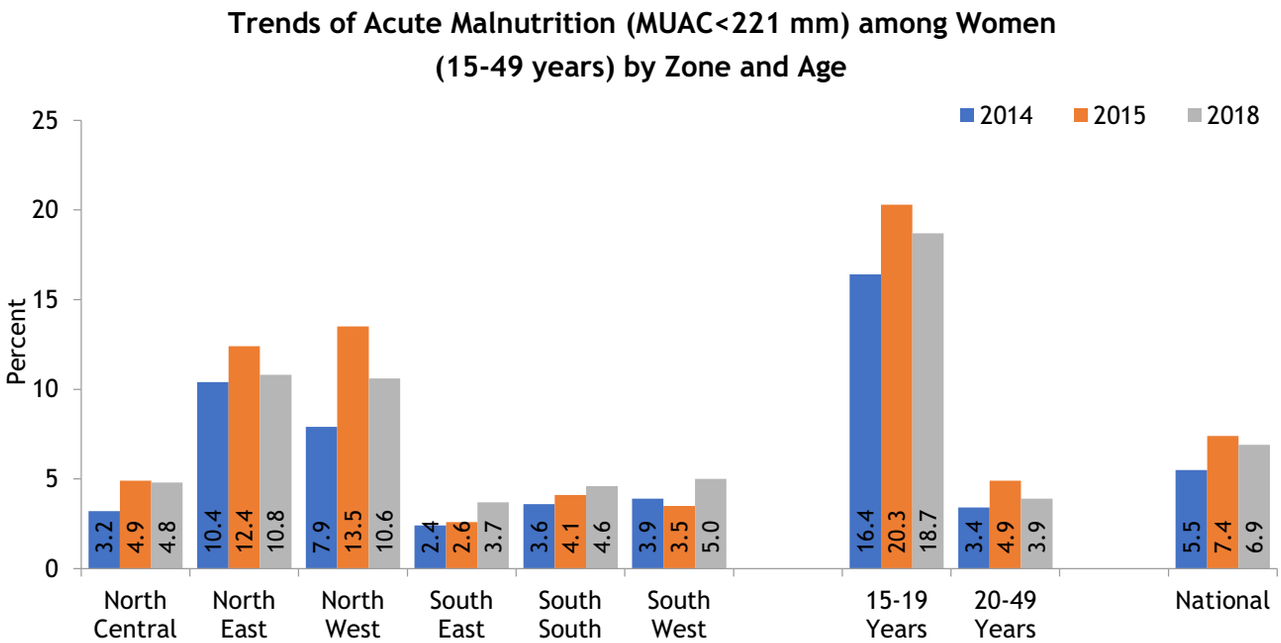

Figure 13: Percent of pregnant women by geopolitical zone and age in years (2014, 2015, and 2018)

Overall, 6.9 percent (95% CI: 6.5-7.4) of Nigerian women of reproductive age were reported as acutely malnourished (MUAC < 221mm) and 3.8 percent (95% CI: 3.5-4.1) as severely malnourished (MUAC <214 mm). Although the geographical distribution of women with acute malnutrition is consistent with previous nutrition surveys conducted since 2014, the situation appears to be stable. Similar GAM and SAM rates of 7.4 percent (95% CI: 7.0-7.9) and 3.7 percent (95% CI: 3.4-4.1) in women were reported in 2015.

The situation was found critical in the North West and the North East, where acute malnutrition in women prevalence were at 11 percent and severe acute malnutrition prevalence at 6 percent in both regions. In the other four zones acute malnutrition prevalence in women (MUAC<221 mm) was either 5 percent (South West) or below but with severe acute malnutrition prevalence of above the limit of 2 percent in all the six geopolitical zones. The South East States reported the lowest prevalence in terms of acute malnutrition in women at 3.7 with severe acute malnutrition of 2.2 percent (Table 19).

At more disaggregated level, eight states, a reduction compared to ten in 2015 NNHS – had acute malnutrition indicators over 10 percent: Bauchi, Borno, Gombe, Jigawa, Kano, Katsina, Yobe and Zamfara. Whereas the levels of acute malnutrition have remained the same in most states, a few states (Ebonyi, Ekiti, FCT, Ondo, and Osun) have shown significant deterioration with more than 50% increase in prevalence compared to NNHS 2015; yet a few others (Katsina, Kebbi, Sokoto, Zamfara, Taraba, and Plateau) have shown significant decrease in prevalence to improved levels.

Further investigation is therefore needed to understand the reasons for such changes of malnutrition indicators among women of reproductive age in these states, considering that the nutrition situation in women has remained the same in most states.

In addition, the prevalence of acute malnutrition was more than four times higher for teenagers (15 to 19 years) than adult women (20 to 49 years), 19 percent compared to 4 percent. This finding highlights the urgency of developing effective interventions to improve the nutrition of adolescent girls for birth outcomes and subsequent nutrition throughout the lifecycle. Improving nutrition in adolescent girls is critical to improving the nutrition status of the entire population.

Table 19:Acute Malnutrition among women of reproductive age (15-49 years) by background characteristics

Background Characteristics	Percentage of women with:		Women of 15-49 Years
	GAM (MUAC<221 mm)	SAM (MUAC<214 mm)	
National	6.9	3.8	23,798
	[6.5-7.4]	[3.5-4.1]	
Zone			
North Central	4.8	2.3	4,645
	[4.0-5.6]	[1.8-2.8]	
North East	10.8	6.0	4,405
	[9.4-12.3]	[5.0-6.9]	
North West	10.6	5.9	5,717
	[9.7-11.6]	[5.0-6.7]	
South East	3.7	2.2	2,616
	[2.9-4.4]	[1.6-2.8]	
South South	4.6	3.1	3,379
	[3.7-5.4]	[2.4-3.9]	
South West	5.0	2.4	3,036
	[4.1-5.8]	[1.8-3.0]	
Age			
15-19 Years	18.7	10.9	5,019
	[17.4-20.1]	[9.9-12.0]	
20-49 Years	3.9	1.9	18,779
	[3.5-4.2]	[1.7-2.2]	
State			
Abia	3.5	2.9	454
	[1.8-5.3]	[1.3-4.5]	
Adamawa	4.7	3.4	759
	[1.8-7.7]	[0.8-6.0]	
Akwa-Ibom	4.8	3.2	603
	[3.0-6.6]	[1.8-4.5]	
Anambra	3.1	1.7	520
	[1.6-4.6]	[0.6-2.9]	
Bauchi	13.0	6.7	825
	[10.0-15.9]	[4.8-8.6]	
Bayelsa	3.6	2.2	502
	[2.0-5.1]	[0.8-3.6]	
Benue	3.4	1.7	655
	[2.1-4.6]	[0.7-2.6]	
Borno	12.6	7.2	665
	[9.8-15.5]	[5.4-9.1]	
Cross River	4.8	3.2	652
	[3.0-6.5]	[1.7-4.8]	
Delta	4.8	2.6	544
	[2.5-7.0]	[1.1-4.1]	
Ebonyi	6.9	4.8	640
	[4.6-9.1]	[2.8-6.9]	
Edo	3.8	2.5	471
	[2.2-5.5]	[1.0-4.1]	
Ekiti	5.8	2.9	445
	[3.7-8.0]	[1.6-4.2]	

Table 19:continued

Background Characteristics	Percentage of women with:		Women of 15-49 Years
	GAM (MUAC<221 mm)	SAM (MUAC<214 mm)	
Enugu	3.5	1.7	537
	[2.1-5.0]	[0.5-2.9]	
FCT	6.4	3.1	636
	[4.1-8.8]	[1.5-4.7]	
Gombe	12.6	5.9	768
	[9.0-16.3]	[3.4-8.3]	
Imo	2.6	1.1	465
	[1.0-4.2]	[0.2-2.0]	
	[11.7-17.0]	[7.4-11.4]	
Kaduna	8.2	5.2	705
	[6.0-10.5]	[3.3-7.2]	
Kano	11.2	5.4	797
	[9.0-13.3]	[3.3-7.5]	
Katsina	12.5	7.2	895
	[10.1-14.9]	[5.0-9.3]	
Kebbi	8.5	4.1	886
	[6.1-10.9]	[2.3-5.8]	
Kogi	5.6	2.3	558
	[3.2-7.9]	[0.8-3.9]	
Kwara	6.2	2.9	481
	[2.9-9.5]	[1.0-4.8]	
Lagos	4	1.7	602
	[2.3-5.7]	[0.4-2.9]	
Nasarawa	3.1	1.3	707
	[2.0-4.2]	[0.4-2.2]	
Niger	6.3	3.1	864
	[4.3-8.2]	[1.8-4.5]	
Ogun	6.2	2.8	563
	[3.9-8.5]	[1.4-4.3]	
Ondo	6.4	3.7	455
	[4.3-8.4]	[2.1-5.3]	
Osun	5.5	2.6	457
	[3.5-7.5]	[1.3-4.0]	
Oyo	4.3	1.9	514
	[2.5-6.0]	[0.8-3.1]	
Plateau	3.0	1.3	744
	[1.6-4.3]	[0.6-2.1]	
Rivers	4.9	4.1	607
	[2.8-7.1]	[2.0-6.2]	
Sokoto	9.1	5.1	810
	[7.1-11.2]	[3.5-6.6]	
Taraba	3.2	2.3	681
	[1.1-5.3]	[0.6-4.1]	
Yobe	18.0	10.0	707
	14.1-21.8	7.4-12.7	
Zamfara	9.0	4.4	845
	[7.4-10.6]	[3.0-5.7]	

Reproductive Health

Skilled Birth Attendant

Nigeria has one of the highest levels of maternal mortality in the world, accounting for 10 percent of maternal deaths worldwide[66]. Three quarters of all maternal deaths occur during delivery and the immediate post-partum period[67]. The single most critical intervention for safe motherhood is to ensure a competent birth attendant with midwifery skills – namely a doctor, nurse or midwife – is present at every birth, and transport is available to a referral facility for obstetric care in case of emergency. The skills and performance of the person providing assistance determine whether complications are properly managed and hygienic practices observed.

A World Fit for Children goal is to ensure that women have ready and affordable access to skilled attendance at delivery. Skilled attendance at delivery is also one of the indicators used to track progress toward the Millennium Development Goal (MDG5) target of reducing the maternal mortality ratio (MMR) by three quarters between 1990 and 2015, and achieving universal access to reproductive health by 2015. According to WHO, UNICEF, UNFPA and the World Bank estimates, Nigeria has made some progress toward MDG5, albeit too slow: in 2010, maternal mortality rate in Nigeria was estimated to be approximately 576 deaths/100,000 live births[68].

Overall, only 46 percent of pregnant women received skilled care during childbirth (Table 20). Figure 14 shows the proportion of live births in the 2 years prior to the survey assisted by a skilled provider by region. The percentage is highest in the South East states (88 percent), where nearly nine deliveries in ten were assisted by a skilled birth attendants, and lowest in the North West states (22 percent), where only one in five deliveries is assisted. Almost half of births occurring from older women were delivered by skilled personnel, while only 37 percent of teenagers received birth assistance.

Skilled birth attendance is disaggregated by state in Table 20. More than 90 percent of all women who had live birth in the two years preceding the survey in Imo, Anambra, Abia, and Osun received skilled care during childbirth. On the other hand, the situation is particularly critical in Sokoto, Zamfara, Jigawa, Katsina, Kebbi, Bauchi and Yobe where more than 80 percent of all deliveries were not assisted by a skilled birth attendant.

[66]Progress for Children: a Report Card on Maternal Mortality, UNICEF 2008
[67]MICS Nigeria, 2011.
[68]National Population Commission (NPC) [Nigeria]. Nigeria Demographic and Health Survey 2013. Calverton, Maryland, USA: National Population Commission and ICF Macro.

Reasons for such a low percentage may be explained by different factors[69], but in some Northern states traditional birth attendants and relatives still account for a significant portion of deliveries. These levels are comparable to the previous findings. According to DHS 2013, traditional birth attendants assisted 22 percent of all deliveries, while 23 percent of births were assisted by a relative. According to MICS 2016-17, 43 percent of all births were assisted by skilled birth attendants.

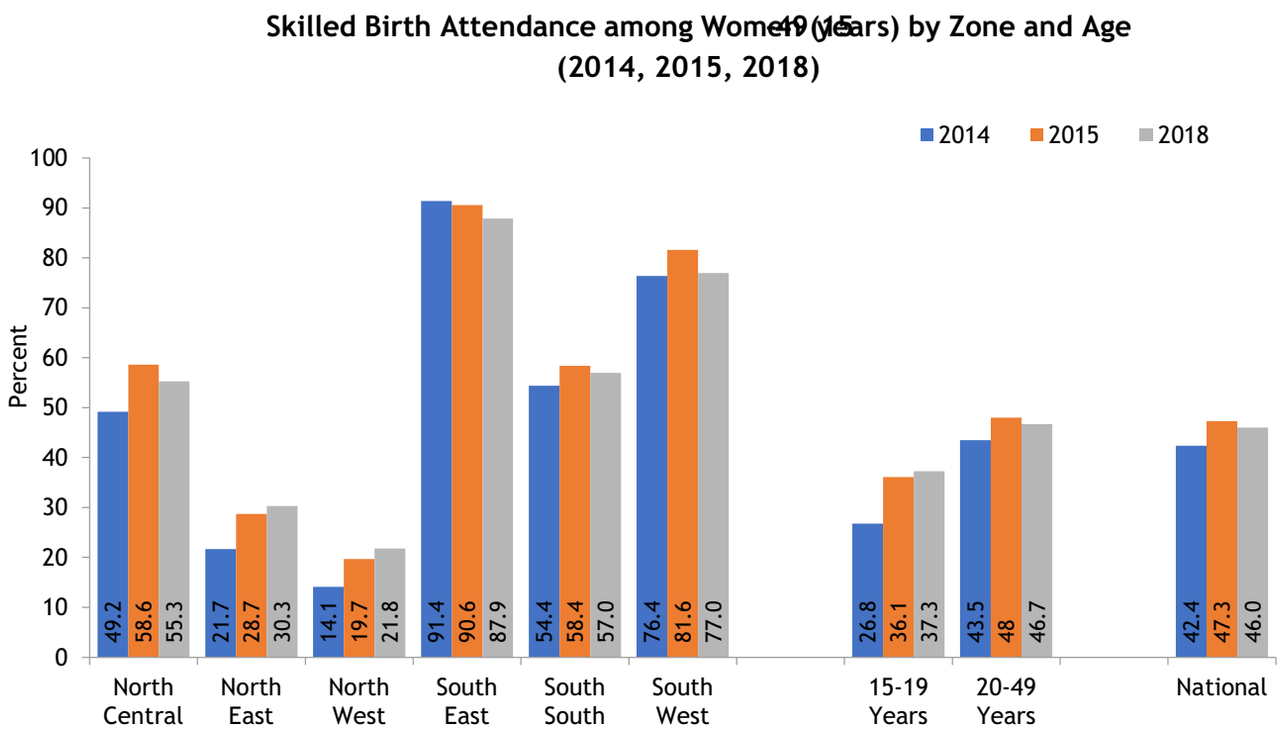

Figure 14: Skilled birth attendant for women of reproductive age by zone and age

[69]According to a recent study, published in the journal Midwifery, and based on a survey conducted in Katsina, women were more likely to use skilled birth attendants if there was staff available, they had their husband's approval, and the service was affordable. Efforts should therefore be made to strengthen the health system, remove fees for maternal health services and encourage men to be more involved.

Table 20: Skilled Birth Attendant by Zone, State and Age of Women (15-49 years)

Background Characteristics	Percentage of women (15-49 years) who had live births in last 2 years and were assisted by:	Women (15-49 years) with live birth in the last 2 years
	Skilled birth attendant	
National	46.0	8,329
	[43.6-48.4]	
Zone		
North Central	55.3	1,543
	[50.2-60.3]	
North East	30.3	1,800
	[26.1-34.6]	
North West	21.8	2,663
	[18.7-24.9]	
South East	87.9	645
	[83.7-92.1]	
South South	57.0	932
	[52.1-61.9]	
South West	77.0	746
	[72.5-81.4]	
Age		
15-19 Years	37.3	654
	[32.8-41.8]	
20-49 Years	46.7	7,675
	[44.2-49.1]	
State		
Abia	96.1	127
	[92.8-99.3]	
Adamawa	45.5	275
	[33.8-57.1]	
Akwa-ibom	43.8	162
	[31.8-558]	
Anambra	98.5	132
	[96.6-100]	
Bauchi	23.2	370
	[15.0-31.5]	
Bayelsa	27.2	151
	[17.9-36.4]	
Benue	56.8	213
	[45.2-68.4]	
Borno	31.9	273
	[21.3-42.5]	
Cross river	71.1	197
	[59.8-82.3]	
Delta	62.3	146
	[52.4-72.3]	
Ebonyi	65.6	157
	[54.1-77.1]	

Table 20: continued

Background Characteristics	Percentage of women (15-49 years) who had live births in last 2 years and were assisted by:	Women (15-49 years) with live birth in the last 2 years
	Skilled birth attendant	
Edo	77.3	128
	[67.2-87.5]	
Ekiti	81.7	126
	[72.2-91.3]	
Enugu	67.2	116
	[52.9-81.6]	
FCT	75.3	190
	[61.4-89.1]	
Gombe	35.6	331
	[26.1-45.2]	
Imo	99.1	113
	[97.4-100]	
Jigawa	19.8	409
	[13.2-26.5]	
Kaduna	28	250
	[19.3-36.7]	
Kano	26.9	350
	[18.1-35.6]	
Katsina	21.4	443
	[15.1-27.8]	
Kebbi	22.2	392
	[13.9-30.5]	
Kogi	73.1	145
	[59.8-86.4]	
Kwara	54.8	177
	[40.4-69.2]	
Lagos	83.2	137
	[74.8-91.6]	
Nasarawa	48.1	216
	[38.2-58.1]	
Niger	50.3	362
	[39.4-61.2]	
Ogun	69.9	136
	[59.6-80.1]	
Ondo	70.3	118
	955.6-85.1]	
Osun	92.0	88
	[86.1-98.0]	
Oyo	68.1	141
	[59.2-77.0]	
Plateau	37.5	240
	[26.0-49.0]	

Table 20: continued

Background Characteristics	Percentage of women (15-49 years) who had live births in last 2 years and were assisted by:	Women (15-49 years) with live birth in the last 2 years
	Skilled birth attendant	
Rivers	52.7	148
	[43.2-62.2]	
Sokoto	13.2	370
	[7.6-18.9]	
Taraba	28.6	234
	[18.5-38.8]	
Yobe	23.3	317
	[12.8-33.9]	
Zamfara	14.0	449
	[9.2-18.9]	

Contraceptive Prevalence Rate

The contraceptive prevalence rate is usually defined as the percentage of married women or in a union who are currently using a method of contraception[70]. Thus being a measure of the actual contraceptive practices, this indicator is also an indicator of the success of family planning programmes. Furthermore, contraceptive prevalence rates have a strong correlation with maternal mortality[71] and can be used to estimate reductions in total fertility rates.

The prevalence of any contraceptive, modern contraceptive and traditional contraceptive method use among all the women in the reproductive age, whether in union/married or not, was 22 percent, 14 percent and 8 percent respectively. Among the women who were in union/married, 25.5 percent used any contractive method – 17.3 percent used modern contraceptive and 8.3 percent used traditional contraceptive method. It is worrying that 74 and 84 percent of the women in union/married and umarried respectively do not use any contraceptive method at all. The results compare to the NNHS 2014 but show reduction from the 2015 results when the estimated prevalence rate for contraceptive use reported a rise from 23 to 30.5 percent among the married women aged 15-49 years.

There is a significant proportion of teenagers using contraceptive methods, although as expected, the prevalence of contraceptive use (5.7 percent) as expected is lower among this age group (15-19 years[72] than among the older counterparts (20-49 years) – prevalence of 27.0 percent. Only 4.8 percent used modern contraceptive method among the teenagers, 17.3 percent among the women aged 20-49 years. Table 21 shows the proportion of women currently married or in union who are using a family planning method according to age, zone and state. Contraceptive prevalence is highest in the South West (50.9 percent) and also high in the South South (42.9 percent) but lowest in North East (5.2 perecnt) and North West (7.9 percent) respectively.

[70]Modern contraceptive methods include female sterilisation, male sterilisation, the pill, the intrauterine device (IUD), injectable, implants, male condoms, female condoms, the diaphragm, foam/jelly, the lactational amenorrhoea method (LAM), and emergency contraception. Traditional methods include the rhythm (periodic abstinence), withdrawal and also folk methods such as herbs.

[71]In Nigeria, unprotected intercourse is the primary cause of unwanted pregnancies, which in many cases leads to abortion. Since abortion is illegal in Nigeria (unless medically recommended to save a mother's life) many abortions are carried out in an unsafe environment. Abortions account for 20%–40% of maternal deaths in Nigeria. Contraceptive practices in Nigeria: Literature review and recommendation for future policy decisions, Journal of Contraception, May 2010.

[72]One reason might be that younger women (age 15-19), more so if living in rural areas, are least likely to know of a contraceptive method. Another reason might be the direct relation between women's use of family planning methods and the number of children they have. In general, women do not begin to use contraception until they have had at least one child and contraceptive use is highest among women with three or four living children, which might be the case for women in older age groups.

Table 21: Percentage of women age 15-49 years currently married or in union who are using (or whose partner is using) a contraceptive method

Background Characteristics	Percentage of women aged 15-49 years currently using:			Number of women age 15-49 years currently married or in union
	Any contraceptive method	Modern contraceptive method	Traditional contraceptive method	
National	25.5	17.3	8.3	16,678
	[24.4,26.7]	[16.4,18.2]	[7.7,8.9]	
Age Group				
15 - 19	5.7	4.8	0.9	1,293
	[4.3,7.5]	[3.5,6.4]	[0.5,1.7]	
20- 49	27.0	18.2	8.8	15,385
	[25.9,28.2]	[17.3,19.2]	[8.2,9.5]	
Zone				
North Central	20.4	15.7	4.7	3,192
	[18.2,22.8]	[13.9,17.8]	[3.7,5.8]	
North East	5.2	3.9	1.2	3,423
	[4.1,6.5]	[3.0,5.1]	[0.8,1.9]	
North West	7.9	6.7	1.2	4,671
	[6.3,9.9]	[5.3,8.5]	[0.7,1.9]	
South East	44.5	18.7	25.8	1,447
	[40.3,48.8]	[16.3,21.3]	[22.5,29.5]	
South South	42.9	27.6	15.3	1,965
	[40.0,45.9]	[25.3,30.0]	[13.3,17.6]	
South West	50.9	36.8	14.0	1,980
	[48.2,53.6]	[34.6,39.2]	[12.2,16.1]	
State				
Abia	41.4	16.8	24.6	268
	[32.7,50.7]	[12.8,21.7]	[18.3,32.3]	
Adamawa	8.7	5.4	3.3	519
	[5.4,13.8]	[3.5,8.2]	[1.5,7.2]	
Akwa Ibo	39.5	25.5	13.9	337
	[33.8,45.4]	[20.9,30.7]	[10.8,17.8]	
Anambra	48.0	15.4	32.7	306
	[38.4,57.8]	[10.4,22.1]	[24.9,41.5]	
Bauchi	4.0	3.4	0.6	705
	[2.5,6.2]	[2.0,5.7]	[0.2,1.4]	
Bayelsa	39.8	24.3	15.5	304
	[33.3,46.7]	[18.9,30.8]	[11.4,20.6]	
Benue	36.8	29.4	7.4	435
	[31.1,42.8]	[23.9,35.7]	[4.4,12.0]	
Borno	4.3	3.9	0.4	512
	[1.8,10.1]	[1.6,9.1]	[0.1,1.5]	
Cross Ri	43.9	28.8	15.1	385
	[38.0,49.9]	[23.8,34.4]	[10.8,20.6]	
Delta	45.6	28.4	17.2	296
	[39.3,52.1]	[23.3,34.1]	[12.1,23.9]	
Ebonyi	41.2	26.5	14.6	328
	[36.1,46.4]	[21.6,32.1]	[11.0,19.2]	
Edo	38.8	29.9	8.9	304
	[31.4,46.8]	[23.9,36.8]	[6.3,12.3]	
Ekiti	38.9	31.9	7.0	298
	[31.6,46.8]	[25.4,39.2]	[4.5,10.8]	
Enugu	46.4	28.1	18.4	267
	[40.7,52.2]	[23.1,33.7]	[14.6,22.8]	
FCT	25.6	22.3	3.2	403
	[18.9,33.6]	[16.1,30.1]	[1.7,6.0]	
Gombe	6.1	5.0	1.1	644
	[3.2,11.0]	[2.4,9.9]	[0.5,2.6]	

Table 21: continued

Background Characteristics	Percentage of women aged 15-49 years currently using:			Number of women age 15-49 years currently married or in union
	Any contraceptive method	Modern contraceptive method	Traditional contraceptive method	
Imo	43.2	12.6	30.6	278
	[32.8,54.1]	[8.5,18.2]	[22.4,40.2]	
Jigawa	0.9	0.6	0.3	652
	[0.4,2.2]	[0.2,2.0]	[0.1,1.2]	
Kaduna	13.0	12.8	0.2	554
	[8.0,20.4]	[7.9,20.1]	[0.0,1.3]	
Kano	10.1	7.7	2.4	626
	[6.0,16.5]	[4.3,13.3]	[1.1,5.2]	
Katsina	6.8	4.6	2.2	722
	[4.1,11.0]	[2.3,8.8]	[1.4,3.5]	
Kebbi	7.8	7.2	0.6	706
	[4.9,12.2]	[4.5,11.5]	[0.2,1.8]	
Kogi	20.9	14.7	6.2	339
	[14.8,28.8]	[10.2,20.9]	[4.0,9.4]	
Kwara	16.9	10.2	6.8	354
	[11.5,24.3]	[7.2,14.2]	[3.7,12.0]	
Lagos	56.2	35.7	20.5	381
	[50.8,61.4]	[31.6,40.0]	[16.6,25.0]	
Nasarawa	23.0	17.3	5.8	469
	[16.4,31.3]	[12.5,23.4]	[3.4,9.6]	
Niger	6.0	4.5	1.5	688
	[3.3,10.4]	[2.4,8.3]	[0.5,4.1]	
Ogun	55.4	36.4	19.0	363
	[49.3,61.3]	[31.7,41.4]	[13.6,26.0]	
Ondo	25.4	23.9	1.4	284
	[19.8,31.8]	[18.7,30.0]	[0.4,4.5]	
Osun	55.8	41.3	14.5	283
	[47.7,63.7]	[33.8,49.3]	[9.4,21.6]	
Oyo	55.3	44.5	10.8	371
	[49.8,60.6]	[39.4,49.7]	[7.9,14.5]	
Plateau	17.9	14.7	3.2	504
	[13.1,23.8]	[10.7,19.8]	[1.7,5.8]	
Rivers	46.6	27.4	19.2	339
	[39.3,54.1]	[22.2,33.4]	[13.8,26.0]	
Sokoto	6.7	6.1	0.6	653
	[4.2,10.6]	[3.8,9.7]	[0.2,1.6]	
Taraba	7.9	5.1	2.8	471
	[4.8,12.7]	[2.7,9.3]	[1.3,5.6]	
Yobe	1.6	1.6	-	572
	[0.8,3.0]	[0.8,3.0]		
Zamfara	6.2	6.1	0.1	758
	[3.7,10.2]	[3.6,10.1]	[0.0,0.9]	

Antenatal Care

Antenatal care (ANC) is one of the components of safe motherhood[73]. The purpose of this specialised form of care is to assure that every pregnancy ends in the birth of a healthy baby with no impairment in the mother's health. Therefore antenatal care should provide timely interventions and information to mothers and families about the danger signs and symptoms during pregnancy, the risks of labour and delivery without the assistance of a skilled health care provider, the importance of birth spacing, tetanus immunisation, syphilis screening and treatment, prevention and treatment of malaria and management of anaemia. More recently, the potential of the antenatal period as an entry point for HIV prevention and care – in particular for the prevention of HIV transmission from mother to child – has led to renewed interest in access to and use of antenatal services.

The World Health Organization recommends a minimum of four antenatal care visits during pregnancy to ensure the well-being of mothers and new-borns. At these visits, women should receive at least a basic care package, including nutritional advice. They should also be alerted to warning signs indicating possible problems during their pregnancy and get support in planning a safe delivery.

As of 2014, on average only 52 percent of pregnant women in the developing regions received the recommended number of antenatal care visits during pregnancy. Progress has been particularly slow in sub-Saharan Africa, where coverage levels have stagnated over the past two decades, with a small increase to 49 per cent of pregnant women receiving the recommended care[74]. In Nigeria, the antenatal care policy follows the latest WHO approach to promote safe pregnancies, recommending at least four ANC visits for women without complications.

Antenatal care coverage for women in the reproductive age group is presented in Table 22. A skilled provider was defined as a Doctor /Nurse /Midwife or Auxiliary Midwife. Coverage of antenatal care by a skilled provider (by a doctor, nurse, midwife, or auxiliary midwife) is moderate in Nigeria with 74 percent of women receiving antenatal care at least once during the pregnancy. Still, more than one in four women who had live birth in two years prior to the survey made no antenatal care visits and thus do not receive the recommended number of ANC visits.

[73]Late antenatal care booking and its predictors among women in south western Nigeria. Online Journal of Health Allied Science 2008.
[74]The Millennium Development Goals Report 2015, United Nations 2015.

The likelihood of ANC attendance was slightly lower among younger women – 68 percent of women aged 15-19 attended at least one visit compared to 75 percent of older women. Teenage women were also less likely to be visited by a skilled provider than women of 20 years or older (66 versus 72 percent). The lowest level of antenatal care was found in North West (61 percent), while the highest level was reported in the South East (96 percent). Variability at state level ranged from 99 percent in Imo to 30 percent in Zamfara for at least one visit; similar to the levels reported in 2015. ANC was delivered by a skilled provider in 71 percent of cases and women were more likely to be visited by a skilled provider in the South East (88 percent) and South West (85 percent) states than in the North West, where rates were estimated at 60 percent, just slightly higher than the 55 percent reported in NNHS 2015.

Reproductive health findings are consistent with women (and child) malnutrition pattern reported in the country: Southern states have better rates as compared to Northern states and teenage women appear to be the more disadvantaged group compared to older women. Poor maternal health in North West and North East zones correspond to the low rates of antenatal care coverage, thus indicating that ANC coverage and services need to be considerably enhanced in order to reduce maternal mortality. While some states have achieved ANC coverage of more than 90 percent, others are still trailing at less than 40 percent (Sokoto and Zamfara)[75].

[75]Nigeria Millennium Development Goals. 2013 Report.

Table 22: Antenatal care coverage for women in the reproductive age group by background characteristics:

Background Characteristics	Percentage of women with live birth in the last two years who received		Number of women age 15-49 years with live birth in the last two years
	At least one ANC Visit	By skilled provider	
National	74.3	71.1	8,329
	[72.1-76.5]	[69.0-73.3]	
Zone			
North Central	77.2	76.3	1,543
	[73.4-81.0]	[72.4-80.2]	
North East	69.7	68.1	1,800
	[64.5-74.9]	[62.9-733]	
North West	60.7	59.5	2,663
	[56.1-65.4]	[54.8-64.1]	
South East	95.6	88.3	645
	[93.8-97.3]	[84.9-91.7]	
South South	81.9	73.7	932
	[78.2-85.5]	[69.5-77.8]	
South West	89.8	84.9	746
	[86.7-92.9]	[81.6-88.1]	
Age			
15-19 Years	68.4	66.1	654
	[63.8-73.0]	[61.5-70.7]	
20-49 Years	74.8	71.6	7,675
	[72.6-76.9]	[69.4-73.7]	
State			
Abia	91.3	89.8	127
	[85.7-96.9]	[84.0-95.5]	
Adamawa	76.7	74.2	275
	[64.0-89.4]	[61.0-87.4]	
Akwa-ibom	81.5	72.8	162
	[73.3-89.7]	[63.5-82.1]	
Anambra	93.9	92.4	132
	[89.8-98.1]	[87.9-96.9]	
Bauchi	66.8	65.1	370
	[55.4-78.1]	[54.1-76.2]	
Bayelsa	55.6	43.0	151
	[42.6-68.6]	[31.3-54.8]	
Benue	67.6	66.2	213
	[58.1-77.1]	[56.3-76.1]	
Borno	73.3	72.5	273
	[59.2-87.3]	[58.4-86.7]	
Cross river	80.2	74.1	197
	[70.0-90.4]	[62.5-85.7]	
Delta	86.3	76.0	146
	[79.0-93.6]	[67.3-84.8]	

Table 22: continued

Background Characteristics	Percentage of women with live birth in the last two years who received		Number of women age 15-49 years with live birth in the last two years
	At least one ANC Visit	By skilled provider	
Ebonyi	95.5	80.9	157
	[92.7-98.4]	[71.5-90.3]	
Edo	90.6	89.1	128
	[83.8-97.4]	[82.2-95.9]	
Ekiti	92.1	91.3	126
	[87.4-96.7]	[86.4-96.1]	
Enugu	97.4	75	116
	[94.8-99.9]	[63.4-86.6]	
FCT	91.1	90.5	190
	[81.2-99.9]	[80.7-99.9]	
Gombe	74.9	72.5	331
	[63.8-86.1]	[61.3-83.7]	
Imo	99.1	97.3	113
	[97.4-99.9]	[94.5-99.9]	
Jigawa	75.1	73.3	409
	[65.3-84.8]	[63.9-82.8]	
Kaduna	79.2	77.2	250
	[72.4-86.0]	[70.0-84.4]	
Kano	72.3	71.7	350
	[60.5-84.1]	[59.9-83.5]	
Katsina	51.5	50.3	443
	[41.8-61.2]	[40.5-60.1]	
Kebbi	61.0	58.9	392
	[52.0-69.9]	[49.7-68.1]	
Kogi	84.8	84.1	145
	[78.0-91.7]	[77.4-90.9]	
Kwara	75.1	75.1	177
	[63.8-86.5]	[63.8-86.5]	
Lagos	94.2	88.3	137
	[89.7-98.7]	[83.3-93.3]	
Nasarawa	85.2	82.4	216
	[79.3-91.0]	[75.8-89.0]	
Niger	78.7	78.5	362
	[71.4-86.1]	[71.1-85.8]	
Ogun	87.5	78.7	136
	[79.8-95.2]	[69.6-87.7]	
Ondo	84.7	83.9	118
	[76.0-93.4]	[75.2-92.6]	
Osun	93.2	92.0	88
	[87.0-99.4]	[85.7-98.3]	
Oyo	85.8	78.7	141
	[77.5-94.2]	[70.3-87.1]	

Table 22: continued

Background Characteristics	Percentage of women with live birth in the last two years who received		Number of women age 15-49 years with live birth in the last two years
	At least one ANC Visit	By skilled provider	
Plateau	69.2	67.9	240
	[57.1-81.2]	[55.7-80.1]	
Rivers	84.5	74.3	148
	[77.2-91.7]	[65.5-83.1]	
Sokoto	41.4	40.5	370
	[30.4-52.3]	[30.0-51.1]	
Taraba	73.9	72.2	234
	[63.9-84.0]	[62.2-82.3]	
Yobe	57.1	56.8	317
	[45.1-69.1]	[44.7-68.8]	
Zamfara	29.6	28.3	449
	[21.5-37.8]	[20.2-36.4]	

HIV Testing

By 2010, it was estimated that 230,000 pregnant women and 360,000 children were living with HIV in Nigeria, and more than 90 percent of children new infections occurred through mother to child transmission (MTCT)[76]. According to UNICEF and WHO, MTCT programme coverage was still very limited: only 5 percent of ANC facilities in Nigeria offered MTCT services, while HIV testing among pregnant women was as low as 14 percent[77].

The same year, Nigeria developed a national scale up plan towards the elimination of mother to child transmission of HIV (2010-2015) and adopted WHO 2010 Guidelines for prophylaxis[78]. However, in 2013 new HIV infections among children had declined by only 19 percent since 2009, and Nigeria still accounted for one quarter of all new HIV infections (nearly 51,000 cases) among children in the 21 priority countries in sub-Saharan Africa: the largest absolute number of any country[79].

[76]UNAIDS report on the global AIDS epidemic. 2010. Joint United Nations program on HIV/AIDS.
[77]World Health Organization, Joint United Nations Programme on HIV/AIDS, United Nations Children's Fund, Towards Universal Access: Scaling up Priority HIV/AIDS Interventions in the Health Sector. Progress report, 2011
[78]Targets were achieving a 50 percent reduction of the transmission of the HIV virus through MTCT by the year 2010 and eliminating pediatric HIV by 2015. Government of Nigeria, Federal Ministry of Health, National Strategic Plan for HIV/AIDS 2010-2015.
[79]UNAIDS. 2014 Progress Report on the global plan towards the elimination of new HIV infections among children by 2015 and keeping their mothers alive. 2014.

Meeting the 2015 targets required a massive effort. The government had taken a bold step to focus on the states with the highest burden of HIV. In addition, it scaled up service delivery to stop new HIV infections among children and embarked on an intensive state-focused data-driven decentralization initiative. Considerable efforts were made to strengthen MTCT interventions and particularly the detection of HIV maternal infection early in pregnancy[80]. Many studies shows that, in the absence of interventions, rates of MTCT generally range from 25 to 40 percent, but with effective interventions, rates have been successfully reduced to below 2 percent[81].

Antenatal care coverage for women of reproductive age group is presented in Table 23. Overall, 57 percent of women were offered HIV testing during ANC, 55 percent accepted to be tested and 45 percent received results; a slight increase from the respective 52 percent, 50 percent and 40 percent reported in 2015. The offering of HIV testing was lower in the case of younger women (aged 15-19) as compared to older women (50 percent versus 57 percent), and the same variation was noted for effective testing (47 versus 55 percent). The offering of HIV testing displayed less variability at zonal level, ranging from 67 percent in the South East and South West to 44 percent in the North West unlike in 2015 when the prevalence of offer on HIV testing ranged from 80 percent in the South East states to 33 percent in the North West. The acceptance of HIV testing varied accordingly, from 65 percent in the South East and South West to 38 percent in the North West.

At state level, HIV testing was offered to eight in ten women in Lagos, FCT, and Imo where HIV testing and provision of results were equally high (more than 70 percent). The lowest rates of testing at state level were obtained in Zamfara (17 percent), Sokoto (26 percent) and Katsina (28 percent) where HIV testing was offered for less than one third of the women – and effective testing rates and provision of results were below 30 percent. A study conducted in Nigeria in 2015 showed that among main reasons for declining testing, were: fear of the test itself, fear of the consequences of a positive test result, knowledge that antiretroviral therapy was not available, and the need to consult her partner before testing. In this study, it was identified that some women were prevented from having the HIV test by their spouse's refusal[82].

[80]In Nigeria, HIV testing is generally offered as an "opt-in" approach, i.e. it is offered during ANC with women choosing whether to be tested or not. The alternative "opt-out" approach, which is prevalent in the U.S.A., provides routine antenatal care testing policy, but it is very rare in Sub-Saharan Africa.
[81]An end to perinatal HIV: Success in the US requires ongoing and innovative efforts that should expand globally. Journal of Public Health Policy 2007
[82]Provider Initiated HIV Testing During Antenatal Care and Labour – Knowledge and Acceptability of Patients in a Nigeria Teaching Hospital, European Journal of Preventive Medicine, July 2015.

Table 23: HIV testing during Antenatal care for women in the reproductive age group by background characteristics

Background Characteristics	Percentage of women with live birth in the last two years who			Number of women age 15-49 years with live birth in the last two years
	were offered a test for HIV	were tested for HIV	received HIV test	
National	56.7	54.6	45.2	8,329
	[54.3-59.0]	[52.2-57.0]	[42.9-47.6]	
Zone				
North Central	59.7	58.3	50.1	1,543
	[55.1-64.3]	[53.6-63.0]	[45.0-55.2]	
North East	59.3	56.4	41.5	1,800
	[53.9-64.7]	[50.9-61.9]	[36.0-47.1]	
North West	44.3	42.2	35.3	2,663
	[39.4-49.2]	[37.3-47.1]	[30.6-40.0]	
South East	68.4	67.5	51.3	645
	[63.4-73.4]	[62.4-72.5]	[45.6-57.0]	
South South	60.2	59.2	50.7	932
	[55.3-65.2]	[54.2-64.2]	[45.9-55.4]	
South West	70.7	67.2	59.7	746
	[66.3-75.1]	[62.6-71.8]	[54.8-64.5]	
Age				
15-19 Years	49.7	46.8	35.3	654
	[44.4-55.0]	[41.5-52.1]	[30.1-40.6]	
20-49 Years	57.2	55.2	46.0	7,675
	[54.9-59.6]	[52.9-57.6]	[43.7-48.4]	
State				
Abia	64.6	63.0	52.0	127
	[54.8-74.3]	[52.5-73.4]	[41.2-62.7]	
Adamawa	62.2	58.2	40.7	275
	[47.2-77.2]	[43.7-72.7]	[26.8-54.6]	
Akwa-ibom	67.3	67.3	49.4	162
	[57.6-77.0]	[57.6-77.0]	[39.1-59.6]	
Anambra	74.2	73.5	61.4	132
	[63.4-85.1]	[62.7-84.3]	[50.2-72.5]	
Bauchi	58.9	58.4	50.5	370
	[47.7-70.2]	[47.0-69.8]	[38.8-62.2]	
Bayelsa	33.8	32.5	31.8	151
	[21.8-45.8]	[20.2-44.7]	[19.6-43.9]	
Benue	56.3	54.9	27.2	213
	[44.8-67.9]	[43.6-66.3]	[15.2-39.3]	
Borno	58.6	56	41.4	266
	[43.7-73.6]	[41.5-70.5]	[28.2-54.5]	
Cross River	65.0	65.0	60.4	197
	[53.1-76.8]	[53.1-76.8]	[48.4-72.4]	
Delta	65.1	63.7	57.5	146
	[54.5-75.6]	[52.8-74.6]	[46.3-68.8]	

Table 23: continued

Background Characteristics	Percentage of women with live birth in the last two years who			Number of women age 15-49 years with live birth in the last two years
	were offered a test for HIV	were tested for HIV	received HIV test	
Ebonyi	52.2	51.6	21.0	157
	[42.1-62.4]	[41.7-61.5]	[13.2-28.8]	
Edo	60.2	55.5	48.4	128
	[47.4-72.9]	[42.6-68.3]	[35.9-61.0]	
Ekiti	63.5	60.3	42.1	126
	[53.5-73.5]	[50.0-70.6]	[33.3-50.8]	
Enugu	60.3	58.6	31.9	116
	[47.9-72.8]	[46.0-71.2]	[21.2-42.6]	
FCT	83.7	83.7	81.1	190
	[71.6-95.8]	[71.6-95.8]	[69.0-93.1]	
Gombe	71.9	70.1	49.5	331
	[61.4-82.4]	[59.6-80.6]	[37.8-61.3]	
Imo	80.5	80.5	72.6	113
	[72.5-88.6]	[72.5-88.6]	[62.7-82.4]	
Jigawa	67.2	66	63.3	409
	[57.0-77.5]	[56.0-76.0]	[53.2-73.5]	
Kaduna	64.8	63.2	54.8	250
	[55.9-73.7]	[53.7-72.7]	[46.1-63.5]	
Kano	57.1	54	37.1	350
	[44.4-69.9]	[41.1-66.9]	[24.2-50.1]	
Katsina	27.8	26.9	26.0	443
	[19.2-36.4]	[18.4-35.3]	[17.7-34.3]	
Kebbi	33.9	32.7	29.6	392
	[24.6-43.3]	[23.4-41.9]	[20.1-39.1]	
Kogi	63.4	63.4	60.0	145
	[52.2-74.7]	[52.2-74.7]	[48.7-71.3]	
Kwara	59.3	59.3	57.6	177
	[47.1-71.5]	[47.1-71.5]	[45.0-70.3]	
Lagos	84.7	83.2	81.8	137
	[78.7-90.6]	[77.0-89.5]	[75.4-88.1]	
Nasarawa	65.7	60.6	52.8	216
	[55.9-75.6]	[49.2-72.1]	[40.4-65.2]	
Niger	51.9	51.1	47.8	362
	[42.3-61.6]	[41.5-60.8]	[38.3-57.3]	
Ogun	68.4	62.5	62.5	136
	[58.8-77.9]	[53.0-72.0]	[53.0-72.0]	
Ondo	55.9	49.2	38.1	118
	[46.1-65.8]	[39.6-58.7]	[28.4-47.9]	
Osun	76.1	75.0	48.9	88
	[65.4-86.9]	[64.2-85.8]	[38.7-59.0]	
Oyo	62.4	58.2	52.5	141
	[51.8-73.0]	[47.1-69.2]	[41.5-63.4]	
Plateau	55.0	51.3	47.9	240
	[42.6-67.4]	[38.1-64.4]	[34.1-61.7]	

Table 23: continued

Background Characteristics	Percentage of women with live birth in the last two years who			Number of women age 15-49 years with live birth in the last two years
	were offered a test for HIV	were tested for HIV	received HIV test	
Rivers	57.4	57.4	48.0	148
	[45.6-69.3]	[45.6-69.3]	[38.3-57.6]	
Sokoto	25.9	25.1	18.9	370
	[16.5-35.4]	[15.6-34.6]	[10.5-27.3]	
Taraba	51.7	47.0	31.6	234
	[39.0-64.5]	[34.3-59.7]	[20.1-43.1]	
Yobe	50.8	44.5	23.7	317
	[38.9-62.7]	[31.4-57.6]	[11.6-35.7]	
Zamfara	16.9	12.5	11.1	449
	[10.2-23.7]	[6.6-18.4]	[5.4-16.9]	

Maternal Newborn and Child Health Week (MNCHW)

The Maternal Newborn and Child Health Week (MNCHW) Programme was launched in Nigeria in 2009 as part of the strategy of the Federal Ministry of Health (FMOH) of Nigeria to accelerate the achievement of the health Millennium Development Goals. Conceived to complement the weak routine services of the PHC system, the MNCHW has been regularly implemented in Nigeria since 2010 as a bi-annual campaign-style programme. During the week, primary healthcare services are offered in health facilities, public places, and at community stations. The maternal and child health services offered include routine and emergency antenatal, intrapartum and postnatal care; routine and emergency obstetric and newborn care; infant and young child nutrition and supplementation; routine immunizations, malaria prevention and distribution of mosquito nets, PMTCT programmes and care of HIV exposed or infected children, health and Water, Sanitation and Hygiene (WASH) education and effective primary health care service and management of common childhood illnesses[83].

MNCHW coverage by zone and state is presented in the below Table 24. Overall, only 30 percent of households surveyed lived in an area where an MNCHW campaign was implemented, and less than one quarter (16 percent) of households had their members receive some MNCHW services. Campaigns were prevalently delivered in proximity of households located in the South West (43 percent) where the percentage of households that received some service was 19 percent, whereas households located in the South East had less chance of benefitting of an MNCHW campaign (only 7 percent of households respectively received some service).

[83]National Guidelines for the Development of Primary Health Care System in Nigeria. NPHCDA 2012.

At state level, services were prevalently delivered in Jigawa, where 43 percent of households benefitted of some campaign services, and in Yobe, Niger and Osun, where about one third of households benefitted of some MNCHW services. On the other hand, the lowest coverages were found in Sokoto, Kwara, Benue and Bayelsa – where fewer than 5 in hundred households benefited of some MNCHW campaign service.

At national level, nearly two-thirds of the MNCHW services were received in other sites out of the health facility such as markets, church/mosque, or schools. Unlike in 2015 when majority (53 percent) of the households received services at families' own house), this time no household reported receiving services in their houses[84], and 35 percent received services at the health facility. However, these percentages varied greatly across zones. Families living in North East and North Central zones received services prevalently in a health facility (60 percent and 52 percent respectively), while families living in the South West, North West, South South and South East preferably received their MNCHW services in other sites other than the health facilty (89, 77, 66 and 60 percent respectively).

[84]Reflecting the policy shift in which MNCHW services are offered in public places and not in houses

Table 24: MNCHW coverage by zone and state

Background Characteristics	Percentage of households who lived in an area where there was a MNCHW campaign	Percentage of households who received some service during a MNCHW campaign	Total No. of HHs	Households who received some services during a MNCHW campaign		No.of HHs
				In a health Facility	In other sites	
National	30.3	15.8	24,857	32.2	67.6	3873
Zone						
North Central	20.1	13.0	4,486	51.8	48	556
	[16.2-24.0]	[10.0-16.0]	51.8	[39.5-64.1]	[35.8-60.3]	
North East	39.4	22.8	3,339	59.9	39.8	769
	[33.8-45.0]	[19.1-26.4]	59.9	[50.0-699]	[29.9-49.7]	
North West	32.2	18.6	4,767	22.7	76.9	856
	[27.7-36.8]	[15.6-21.6]	22.7	[15.4-30.1]	[69.5-84.2]	
South East	15.1	7.2	3,363	40.4	59.6	240
	[12.0-18.3]	[5.4-9.1]	40.4	[27.2-53.7]	[46.3-72.8]	
South South	23.9	10.5	4,093	33.7	65.9	426
	[20.4-27.4]	[8.7-12.3]	33.7	[25.1-42.3]	[57.4-74.5]	
South West	43.4	19	4,126	10.6	89.4	857
	[38.5-48.3]	[16.5-21.6]	10.6	[6.4-14.7]	[85.3-93.6]	

Vitamin A

Vitamin A is an essential micronutrient for child development. At younger ages, inadequate intake can result in vitamin A deficiency (VAD) causing xerophthalmia, a serious eye disorder that can lead to blindness. Sub-clinical Vitamin A deficiency makes children more vulnerable to infection, reducing the ability to fight common childhood diseases, such as measles, diarrhoea and acute respiratory infections (ARI). It is estimated that increasing vitamin A intake can decrease childhood mortality from such illnesses by 12 percent, or nearly one-eighth of childhood deaths[85].

Children can receive Vitamin A from foods, fortified foods and supplements. A healthy diversified diet should be composed of foods rich in vitamin A and with an adequate fat and other micronutrients which faciltitate the vitamins absorption; such foods include breast milk, dairies, liver, eggs, meat, fish, butter, mangoes, papayas, carrots, pumpkins, and dark green leafy vegetables. In Nigeria, large-scale fortification has also been used as a strategy for increasing Vitamin A intakes amongst the population through the production of fortified staple foods including sugar, oil, margarine, cereal grains, various types of flour and condiments. Although food-based approaches, such as consumption of foods rich in vitamin A and of fortified foods, are becoming increasingly feasible, for large numbers of children aged 6-23 moths, these foods remain either unavailable or inaccessible. Global guidance recommends that bi-annual high dose supplements be given to children 6-59 months who are at risk of Vitamin A deficiency which remins the case for Nigeria[86].

In Africa, Vitamin A deficiency alone is responsible for almost 6 percent of child deaths under the age of 5 years[87]. Therefore, alongside with appropriate Infant and Young Children Feeding Practices, interventions for adequate micronutrients intake for children 6 to 59 months of age should include vitamin A supplementation. Vitamin A is a fat-soluble vitamin and can be stored in the body for about six months; it is for this reason that two annual doses of high-potency supplements are adequate for addressing the adverse effects associated with vitamin A deficiency. In Nigeria, campaigns are in place for semi-annual mass supplementation of vitamin A capsules. They are usually held in May and November, during the Maternal Newborn and Child Health Weeks.

[85] https://www.ncbi.nlm.nih.gov/pubmed/?term=Vitamin+A+supplementation+for+preventing+disease+and+death+in+children+aged+six+months+to+five+years
[86] Vitamin A Supplementation: A decade of progress, The United Nations Children's Fund (UNICEF), 2007
[87] Guideline: Vitamin A supplementation in infants and children 6–59 months of age, World Health Organization, Geneva 2011

According to NNHS 2018 survey results, only 41 percent (comparable to 42 percent in 2015) of the children aged between 6 to 59 months received vitamin A supplement in the 6 months prior to the survey (Table 25), and so nearly six in ten Nigerian children do not receive adequate levels of supplementation and are at risk of vitamin A deficiency. This coverage is however, a slight improvement from NNHS 2014 findings that recorded prevalence of 35 percent. However, it should be noted that information on vitamin A are prevalently based on mother's recall, therefore findings should be interpreted with caution.

At zone level, the lowest levels of supplementation were this time reported in the North Central (27 percent), followed by North West (31 percent) respectively. The highest coverage was reported in South West where nearly two-thirds of the children (64 percent) received Vitamin A supplement. In 2015 South West also recorded the highest coverage but with a higher percentage (70 percent). According to UNICEF standard a coverage threshold of 70 percent is the minimal coverage at which countries can expect to observe reductions in child mortality[88]. In the 37 domains surveyed, only two states: - Osun (86.5 percent) and Jigawa (73.9 percent) had coverage above the prescribed threshold, indicating a gradual deterioration – in 2015 there were five states and in 2014 there were seven states. The situation is particularly critical in Sokoto, Kwara and Zamfara, where fewer than one in ten children reported to have received vitamin A supplement. Table 25 shows that the proportion of children who received vitamin A is spread even (from 39 to 42 percent) across the ages. Since younger children seem to be at greater risk of VAD, it is vital to continue monitoring the supplementation programme progresses.

Deworming

Helminths are a group of parasites commonly referred to as worms and include schistosomes and soil-transmitted helminths. Schistosome and soil-transmitted helminth infections are among the most common infections in developing countries. They can impair nutritional status by causing internal bleeding which can lead to loss of iron and anemia; malabsorption of nutrients; diarrhoea and loss of appetite which can lead to a reduction in energy intake; and infections that can cause cognitive impairment as well as tissue damage.

The nutritional impairment caused by schistosome and soil-transmitted helminth infections during childhood has been shown to have a significant impact on growth and development of children. Periodic deworming of children can reduce the transmission of schistosome and soil-transmitted helminth infections. However, drug therapy alone is only a short-term measure of reducing worm infection and re-infection is frequent. Thus, control measures with improvement of water and sanitation, and health education are needed to prevent infection and re-infection[89].

[88]Tracking progress on child and maternal nutrition: A survival and development priority, UNICEF 2009
[89]Deworming to combat the health and nutritional impact of helminth infections, WHO, 2014

Overall, only 40 percent of children aged 12-59 months have received deworming medication. Zonal coverage ranges from 26 and 27 percent in North West and North Central respectively to 60 percent in South East. At the state level, coverage varied with Sokoto, Zamfara and Plateau (8 percent, 12 percent and 13 percent respectively) recording the lowest percentages, while Imo (76 percent) reporting the highest coverage followed by Abia at 71 percent. Deworming coverage over 50 percent was reported in ten states – Imo, Abia, Lagos, Jigawa, Anambra, Yobe, Osun, Ekiti, Oyo and Rivers. In 2015 only seven states – Abia, Anambra, Borno, Edo, Imo, Lagos, and Ogun had coverage above 50 percent. These results are based on mother's recall and should thus be interpreted with caution. In any case, since Sub-Saharan Africa has the highest prevalence of helminths parasites worldwide[90], domains should all be supported to improve coverage of deworming.

[90]Soil transmitted helminth infection: Fact sheet No 366, WHO, 2013

Table 25: Percentage of children 6-59 months of age who received vitamin A tablets 6 months prior to the survey and percent of children age 12-59 months given an anthelminthic drug in the past 6 months by background characteristic

Background Characteristics	Children age 6-59 months who received at least one high-dose vitamin A supplement in the 6 months preceding the survey		Children (12-59 months) who received an anthelmintic drug in the 6 months preceding the survey	
		Children 6-59 months		Children 12-59 months
National	40.8	17,438	40.4	15,323
	[38.7-42.9]	40.4	[38.4-42.5]	
Sex of child				
Male	40.8	8774	39.8	7,685
	[38.5-43.0]	39.8	[37.6-42.1]	
Female	40.8	8664	41.1	7,638
	[38.5-43.1]	41.1	[38.8-43.4]	
Age Group				
6-11 months	39.7	2,115		
	[36.5-42.8]	0		
12-23 months	42.3	3,976	35.1	3,976
	39.4-45.1	35.1	32.6-37.6	
24-35 months	42.3	3,951	41.4	3,951
	[39.6-45.0]	41.4	[38.7-44.0]	
36-47 months	39.6	3,859	42.9	3,859
	[37.1-42.2]	42.9	[40.4-45.5]	
48-59 months	39.2	3,537	42.6	3,537
	36.6-41.8	42.6	39.9-45.3	
Zone				
North Central	27.2	3,230	26.8	2,833
	[22.6-31.7]	26.8	[22.5-31.2]	
North East	44.1	3,806	36.1	3,347
	[39.0-49.3]	36.1	[31.0-41.3]	
North West	30.7	5213	25.8	4538
	[25.9-35.6]	25.8	[21.1-30.4]	
South East	32.3	1,464	60.3	1,316
	[25.9-35.6]	60.3	[55.8-64.9]	
South South	43.9	1974	45.8	1755
	[38.7-49.1]	45.8	[41.2-50.5]	
South West	64	1751	55.9	1,534
	[59.2-68.4]	55.9	[51.5-60.3]	
State				
Abia	28.0	282	71.0	252
	[20.5-35.5]	71	[63.7-78.4]	
Adamawa	46.5	518	31.9	454
	[31.3-61.8]	31.9	[17.5-46.3]	

Table 25: continued

Background Characteristics	Children age 6-59 months who received at least one high-dose vitamin A supplement in the 6 months preceding the survey		Children (12-59 months) who received an anthelmintic drug in the 6 months preceding the survey	
		Children 6-59 months		Children 12-59 months
Akwa-Ibom	48.7	357	49.2	319
	[38.8-58.7]	49.2	[39.2-59.2]	
Anambra	31.0	316	63.4	284
	[20.7-41.3]	63.4	[55.6-71.2]	
Bauchi	29.3	817	22.8	720
	[22.5-36.0]	22.8	[16.5-29.0]	
Bayelsa	33.2	319	43.8	281
	[22.8-43.6]	43.8	[32.0-55.5]	
Benue	11	474	12.5	415
	[4.9-17.0]	12.5	[6.0-19.1]	
Borno	58.2	570	46.7	488
	[47.2-69.3]	46.7	[32.9-60.5]	
Cross River	46.6	386	49.0	347
	[36.4-56.8]	49	[38.3-59.7]	
Delta	29.6	307	34.4	273
	[19.3-40.0]	34.4	[24.2-44.7]	
Ebonyi	25.4	343	35.1	308
	[16.1-35.1]	35.1	[25.1-45.0]	
Edo	31.6	297	45	262
	[22.2-41.1]	45	[34.8-55.3]	
Ekiti	66.9	278	55.4	242
	[54.4-79.4]	55.4	[45.7-65.0]	
Enugu	41.8	249	44.7	228
	[28.3-55.3]	44.7	[35.8-53.6]	
FCT	40.6	379	43.3	319
	[26.1-55.2]	43.3	[28.4-58.2]	
Gombe	58.5	714	44.7	642
	[46.5-70.6]	44.7	[31.8-57.6]	
Imo	32.5	274	75.8	244
	[23.9-41.0]	75.8	[68.4-83.2]	
Jigawa	73.9	812	64.1	711
	[63.8-84.0]	64.1	[53.1-75.2]	
Kaduna	37.6	532	19.4	465
	[24.5-50.7]	19.4	[9.7-29.0]	
Kano	37.0	738	32.2	642
	[25.6-48.3]	32.2	[20.5-44.0]	
Katsina	13.0	844	16.6	742
	[7.2-18.9]	16.6	[10.2-23.0]	

Table 25: continued

Background Characteristics	Children age 6-59 months who received at least one high-dose vitamin A supplement in the 6 months preceding the survey		Children (12-59 months) who received an anthelmintic drug in the 6 months preceding the survey	
		Children 6-59 months		Children 12-59 months
Kebbi	23.8	764	18.6	676
	[14.0-33.7]	18.6	[8.8-28.5]	
Kogi	20	325	20.8	284
	[12.3-27.7]	20.8	[12.9-28.7]	
Kwara	7.9	380	19.5	334
	[3.2-12.6]	19.5	[11.5-27.4]	
Lagos	55.9	297	64.8	256
	[48.4-63.4]	64.8	[56.5-73.2]	
Nasarawa	46.6	453	34.0	403
	[33.3-59.8]	34	[22.9-45.1]	
Niger	45	736	48.2	651
	[31.8-58.2]	48.2	[35.5-61.0]	
Ogun	52.0	369	44.8	324
	[41.3-62.8]	44.8	[37.3-52.2]	
Ondo	64.4	250	46.5	213
	[51.8-77.0]	46.5	[37.2-55.8]	
Osun	86.5	230	62.7	209
	[79.5-93.6]	62.7	[52.9-72.5]	
Oyo	69.4	327	51.4	290
	[59.3-79.6]	51.4	[39.8-63.0]	
Plateau	25.7	483	13.3	427
	[15.4-36.0]	13.3	[8.0-18.7]	
Rivers	60.1	308	51.3	273
	[47.8-72.4]	51.3	[40.3-62.3]	
Sokoto	6.2	745	8.1	642
	[1.6-10.8]	8.1	[2.8-13.4]	
Taraba	23.9	510	22.7	444
	[10.6-37.2]	22.7	[9.9-35.6]	
Yobe	63.1	677	62.9	599
	[51.3-74.8]	62.9	[50.4-75.5]	
Zamfara	9.9	778	11.7	660
	[5.7-14.1]	11.7	[6.6-16.7]	

Water and Sanitation (WASH)

Access to water supply and sanitation facility has considerable health and economic benefits to both households and individuals. Lack of access to safe drinking water and inadequate disposal of human excreta are associated with a range of diseases, including diarrhoea, schistosomiasis and intestinal helminths. According to United Nations[91], in 2011, 64 percent of world population had access to improved sanitation facility[92] and 89 percent used an improved drinking water source[93]. Despite these global achievements, sub-Saharan Africa remains far behind, and only 30 percent and 63 percent of population have access to sanitation facility and safe drinking water respectively[94].

Nigeria's goal was to increase access to improved drinking water to 77 percent and to improved sanitation to 69.5 percent by the end of 2015. It is a serious challenge since reaching these targets can speed up the achievement of all MDGs[95]. In the past years, the progress on the proportion of the population accessing safe water has not been stable. In 2008 the figure was 56 per cent, in 2011 it improved to 59 percent, in 2012 it declined to 57 percent and in 2014 a further decline to 52 percent (NNHS 2014).

In this NNHS, 57 percent of households nationally were reported to have access to an improved source of drinking water in this survey (Table 26). Geopolitically, the South South and South East has the highest access to an improved source of drinking water (66 and 65 percent respectively), while the North East zone has the lowest (50 percent), but indicating some improvement. Among states, the proportion varies from 27 percent in Enugu, followed by 36 percent in Kebbi to 84 percent in Imo. Only Imo and Rivers (81 percent) states have percentages above the targeted level of 77 percent: Access below 50 percent was found in ten states: - Bayelsa, Benue, Borno, Enugu, Gombe, Katsina, Kebbi, Lagos, Sokoto, and Taraba.

The proportion of households that has access to improved sanitation was 47 percent, a further improvement from 37 percent in 2015; 31 percent in 2008 and 34 per cent in 2012. In the South West, more than two-thirds of households have access to improved sanitation facility (69.3 percent), while in the North West slightly more than one third of the households (34.3 percent) have access.

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[91]UN Millennium Development Goals Report, United Nations 2013
[92]An improved sanitation facility is defined as one that hygienically separates human excreta from human contact. Improved sanitation facilities for excreta disposal include flush or pour flush to a piped sewer system, septic tank or pit latrine; ventilated improved pit latrine, pit latrine with slap, and use of a composting toilet.
[93]Improved source of drinking water are any of the following types of supply: piped water (into dwelling, compound, yard or plot, to neighbour, public tab/standpipe), tube well/borehole, protected well, protected spring and rain water.
[94]UN Millennium Development Goals Report, United Nations 2013
[95]The MDG7 is to reduce by half the proportion of people without sustainable access to safe drinking water. The world fit for children goal calls for reduction of at least one third of the proportion of households without access to hygienic sanitation facilities and safe drinking water.

Table 26: Percent distribution of household using improved drinking water sources and having access to improved sanitation facility, by background characteristics

Background Characteristics	Percentage of Households with:		Total No. of Households
	Improved source of drinking water	Improved Sanitation Facility	
National	56.8	46.8	24,857
	[54.5-59.1]	[44.4-49.2]	
Zone			
North Central	53.2	39.3	4,486
	[47.9-58.5]	[34.3-44.3]	
North East	49.9	33.8	4,022
	[43.7-56.2]	[28.7-38.8]	
North West	54	34.3	4,767
	[48.4-59.5]	[29.3-39.4]	
South East	65.2	56.2	3,363
	[59.6-70.8]	[51.1-61.2]	
South South	65.9	49.4	4,093
	[61.3-70.5]	[44.0-54.7]	
South West	55.5	69.3	4,126
	[50.7-60.3]	[63.9-74.6]	
State			
Abia	71.6	77.4	654
	[60.0-83.1]	[68.3-86.4]	
Adamawa	50.8	23.5	671
	[35.9-65.7]	[13.3-33.8]	
Akwa-ibom	68.6	55.5	704
	[57.8-79.4]	[43.6-67.4]	
Anambra	68.4	69.5	668
	[58.3-78.5]	[59.7-79.3]	
Bauchi	55.7	31.5	693
	[41.2-70.2]	[20.2-42.7]	
Bayelsa	30.9	19.1	676
	[19.5-42.3]	[8.9-29.3]	
Benue	40.6	26.3	623
	[26.3-54.9]	[15.0-37.7]	
Borno	48.8	54	683
	[34.6-62.9]	[40.5-67.5]	
Cross River	50.6	34.2	701
	[38.4-62.9]	[23.1-45.4]	
Delta	71.4	56	671
	[60.7-82.1]	[44.1-67.9]	
Ebonyi	73.7	18.9	689
	[62.1-85.4]	[9.4-28.4]	
Edo	62.5	71.9	645
	[51.9-73.1]	[60.8-83.1]	

Table 26: continued

Background Characteristics	Percentage of Households with:		Total No. of Households
	Improved source of drinking water	Improved Sanitation Facility	
Ekiti	72.4	54.5	688
	[63.8-81.0]	[43.0-66.0]	
Enugu	26.8	42.7	694
	[17.0-36.6]	[32.2-53.1]	
FCT	54.0	75.5	617
	42.6-65.3	62.9-88.2	
Gombe	47.3	48.2	683
	[32.3-62.3]	[35.1-61.2]	
Imo	84.2	58.8	658
	[75.0-93.4]	[49.8-67.8]	
Jigawa	75.9	24.5	681
	[63.8-88.0]	[14.5-34.6]	
Kaduna	58.9	45.6	618
	[45.3-72.5]	[33.4-57.9]	
Kano	55.5	60.5	669
	[42.6-68.3]	[49.8-71.3]	
Katsina	48.4	17.1	701
	[34.2-62.5]	[8.4-25.8]	
Kebbi	36.1	15.7	714
	[23.3-48.9]	[8.1-23.3]	
Kogi	64.8	39.5	623
	[51.6-78.1]	[27.5-51.5]	
Kwara	62.3	37.3	663
	[50.1-74.5]	[24.1-50.4]	
Lagos	37.1	94.3	696
	[28.4-45.7]	[88.2-9.99]	
Nasarawa	59.3	36.7	607
	[45.0-73.7]	[25.1-48.3]	
Niger	50.4	35.1	686
Ogun	59.2	65.6	703
	[48.8-69.5]	[53.9-77.3]	
Ondo	56.1	49.3	665
	[43.5-68.7]	[35.9-62.8]	
Osun	67.7	60.3	687
	[57.9-77.5]	[48.2-72.3]	
Oyo	67.7	55.6	687
	[57.7-77.6]	[42.7-68.5]	
Plateau	50.4	37.6	667
	[37.3-63.4]	[25.3-49.9]	

Table 26: continued

Background Characteristics	Percentage of Households with:		Total No. of Households
	Improved source of drinking water	Improved Sanitation Facility	
Rivers	80.7	44.0	696
	[73.0-88.5]	[31.6-56.4]	
Sokoto	40.3	19.2	692
	[26.2-54.5]	[8.8-29.6]	
Taraba	36.5	24.5	625
	[22.5-50.5]	[14.9-34.1]	
Yobe	53.7	25.2	667
	[37.9-69.5]	[14.7-35.7]	
Zamfara	54.8	15.6	692
	[40.4-69.1]	[5.9-25.3]	

The percentage with access to sanitation facilities varies significantly among states (Table 26), the highest rate reported in Lagos (94 percent) and the lowest rate in Zamfara and Kebbi (16 percent). Finally, 30 percent of households had no facility at all or used an open defecation (bush/field).

Disposal of child faeces

Children's faeces are the most likely cause of faecal contamination to the immediate household environment and thus safe disposal of children's faeces is critical. In this respect, safe disposal of stools implies children use of a toilet, stool rinsed into a toilet or stools buried.

Disposal of faeces of children 0 to 3 years of age is presented in Table 26. Nationally, 53 percent percent of the children age 0 to 3 years has their faeces disposed safely, indicating no significant change from 55 percent reported in NNHS 2015. Percentages vary among zones – ranging from 27 percent in North Central to 70 percent in North West. The lowest percentage is found in Kogi, Kwara (17 percent) and Bayelsa (18 percent), while the highest is in Kano (85 percent). From Table 27, nearly half of the children have their faeces rinsed into toilet (49 percent), while nearly one third have their faeces thrown into the garbage (28 percent).

Table 27: Percent distribution of children age 0 to 3 years whose stools were disposed of safely the last time the child passed stools

Background Characteristics	Percentage of children whose last stools were disposed by:					Children aged 0-35 months
	using toilet	rinsing into toilet/latrine	burrying	any safe disposal	Thrown in garbage	
National	1.3	48.9	2.3	52.5	27.5	12,075
	[1.0-1.6]	[46.4-51.5]	[1.6-2.9]	[50.0-55.0]	[25.4-29.5]	
Sex						
Male	1.3	48.1	2.0	51.4	28.5	6,068
	[0.9-1.7]	[45.4-50.8]	[1.4-2.7]	[48.7-54.1]	[26.2-30.8]	
Female	1.2	49.8	2.5	53.5	26.4	6,007
	[0.9-1.6]	[47.0-52.5]	[1.7-3.3]	[50.8-56.2]	[24.2-28.6]	
Zone						
North Central	0.2	25.8	1.0	27.0	41.8	2,251
	[0.0-0.4]	[21.2-30.4]	[0.2-1.7]	[22.3-31.6]	[36.4-47.2]	
North East	2.4	58	2.8	63.2	22.4	2,631
	[1.5-3.3]	[52.4-63.6]	1.6-3.9]	[57.8-68.7]	[17.9-26.9]	
North West	1.6	63.0	4.8	69.5	17.9	3,732
	[1.1-2.2]	[57.8-68.3]	[2.8-6.8]	[64.6-74.3]	[14.0-21.8]	
South East	0.4	41.7	1.4	43.5	35.5	980
	[0.0-0.9]	[36.4-47.0]	[03-2.6]	[38.2-48.8]	[2.7-30.2]	
South South	1.0	34.0	2.3	37.2	36.0	1,309
	[0.3-1.6]	[28.8-39.3]	[0.5-4.0]	[32.0-42.5]	[30.6-41.4]	
South West	1.6	57.1	0.2	58.8	21.8	1,172
	[0.6-2.5]	[51.4-62.7]	[0.0-0.4]	[53.3-64.4]	[17.8-25.9]	
State						
Abia	0	53.3	2.2	55.4	29.9	184
	[0.0-0.0]	[43.8-62.7]	[0.0-4.7]	[46.0-64.8]	[21.8-37.9]	
Adamawa	0.3	48.7	1.6	50.5	35.8	380
	[0.0-0.8]	[34.2-62.9]	[0.0-3.7]	[36.3-64.5]	[23.3-48.1]	
Akwa-ibom	0.4	49.3	0.9	50.7	26.2	225
	[0.0-1.3]	[37.3-60.9]	[0.0-2.1]	[38.6-62.3]	[16.5-35.7]	
Anambra	1.4	45.7	0	47.1	30.5	210
	[0.0-3.5]	[33.9-57.5]	[0.0-0.0]	[35.2-59.1]	[23.1-37.9]	
Bauchi	4.7	61.9	0.9	67.5	22.1	548
	[2.3-7.1]	[51.2-72.1]	[0.0-2.2]	[56.5-78.0]	[12.6-31.4]	
Bayelsa	0.5	14.9	3.0	18.3	46.5	202
	[0.0-1.4]	[3.3-25.9]	[0.0-6.8]	[6.4-29.7]	[32.1-59.7]	
Benue	0.3	27.4	0.3	28.1	29.3	317
	[0.0-0.9]	[17.2-37.5]	[0.0-0.9]	[17.8-38.2]	[13.3-45.2]	
Borno	0.2	78.1	1.7	80.0	13.2	401
	[0.0-0.7]	[64.1-92.0]	[0.0-3.8]	[66.7-93.4]	[3.1-23.3]	
Cross River	0.8	22.6	0.8	24.2	42.5	252
	[0.0-1.9]	[12.6-31.8]	[0.0-1.8]	[13.8-33.7]	[27.2-56.1]	
Delta	0	25.9	0.5	26.4	46.8	201
	[0.0-0.0]	[15.2-35.6]	[0.0-1.4]	[15.8-35.9]	[31.8-59.9]	
Ebonyi	0	31.0	0	31.0	36.4	242
	[0.0-0.0]	[22.0-39.7]	[0.0-0.0]	[22.0-39.7]	[22.0-50.4]	
Edo	5.1	48.0	0.5	53.5	20.2	198
	[1.2-8.9]	[37.3-58.6]	[0.0-1.5]	[42.3-64.7]	[11.8-28.6]	
Ekiti	0.5	39.9	0	40.4	33.3	183
	[0.0-1.6]	[28.0-51.7]	[0.0-0.0]	[28.5-52.4]	[19.8-46.9]	

Table 27: continued

Background Characteristics	Percentage of children whose last stools were disposed by:					Children aged 0-35 months
	using toilet	rinsing into toilet/latrine	burrying	any safe disposal	Thrown in garbage	
Enugu	0	32.1	0	32.1	54.5	165
	[0.0-0.0]	[18.9-44.9]	[0.0-0.0]	[18.9-44.9]	[38.7-69.7]	
FCT	1.1	28.7	0	29.9	53.7	268
	[0.0-2.4]	[17.4-39.7]	[0.0-0.0]	[18.2-41.0]	[41.5-65.2]	
Gombe	4.8	68.8	2.4	76.0	9.6	500
	[1.8-7.7]	[56.1-80.9]	[0.2-4.6]	[64.4-87.0]	[3.4-15.7]	
Imo	0	44.0	4.6	48.6	29.1	175
	[0.0-0.0]	[33.3-53.7]	[0.5-8.6]	[38.6-57.5]	[20.5-37.1]	
Jigawa	1.7	51.3	2.3	55.4	28.4	598
	[0.0-3.3]	[36.4-66.1]	[0.0-5.1]	[40.8-69.8]	[15.7-41.1]	
Kaduna	2.7	69.7	0.3	72.7	16.2	370
	[0.9-4.4]	[57.7-80.7]	[0.0-0.8]	[60.4-83.9]	[4.5-27.7]	
Kano	1.9	82.3	0.9	85.1	10.6	537
	[0.4-3.3]	[72.7-91.6]	[0.0-2.7]	[76.8-93.1]	[3.7-17.5]	
Katsina	0.7	68.3	13.2	82.1	7.7	599
	[0.0-1.4]	[55.9-79.1]	[3.9-22.2]	[72.8-89.6]	[3.2-12.0]	
Kebbi	1.1	41.0	10.7	52.9	28.2	524
	[0.0-3.0]	[27.3-54.5]	[3.1-18.2]	[40.1-65.3]	[18.8-37.5]	
Kogi	0	17	0	17.0	40.9	230
	[0.0-0.0]	[7.9-26.0]	[0.0-0.0]	[7.9-26.0]	[28.2-53.6]	
Kwara	0	17.0	0	17.0	40.9	259
	[0.0-0.0]	[6.1-27.5]	[0.0-0.0]	[6.1-27.5]	[28.1-52.8]	
Lagos	1.8	72.6	0	74.3	23.9	226
	[0.0-3.9]	[64.7-80.4]	[0.0-0.0]	[67.3-81.4]	[16.9-30.9]	
Nasarawa	0.3	48.7	6.0	55.0	26.2	302
	[0.0-1.0]	[33.6-63.1]	[0.1-11.7]	[41.5-67.7]	[15.1-36.9]	
Niger	0	25.2	0	25.2	51.5	528
	[0.0-0.0]	[14.0-36.0]	[0.0-0.0]	[14.0-36.0]	[38.9-63.4]	
Ogun	1.3	64.8	0	66.1	21.5	233
	[0.0-2.7]	[52.5-76.5]	[0.0-0.0]	[54.0-77.6]	[11.6-31.3]	
Ondo	0.6	39.4	0	40.0	15.2	165
	[0.0-1.8]	[27.4-51.4]	[0.0-0.0]	[27.9-52.1]	[7.3-23.0]	
Osun	0	60.8	0	60.8	25.9	143
	[0.0-0.0]	[48.2-72.6]	[0.0-0.0]	[48.2-72.6]	[15.5-35.9]	
Oyo	3.2	40.5	0.9	44.5	15.5	220
	[0.4-5.9]	[27.9-53.0]	[0.0-2.2]	[30.8-58.3]	[5.0-25.9]	
Plateau	0	25.8	2.7	28.5	47.7	333
	[0.0-0.0]	[13.3-38.1]	[0.0-5.9]	[15.9-40.8]	[35.1-59.9]	
Rivers	0	33.9	6.0	39.9	38.5	218
	[0.0-0.0]	[21.2-46.7]	[0.0-12.2]	[27.6-52.2]	[26.6-50.4]	
Sokoto	2.4	33.6	9.0	45.0	34.2	509
	[0.8-3.9]	[20.3-46.8]	[1.6-16.5]	[30.5-59.3]	[20.8-47.5]	
Taraba	0	38.9	6.9	45.8	30.2	334
	[0.0-0.0]	[24.7-53.1]	[2.6-11.2]	[33.1-58.5]	[18.9-41.6]	
Yobe	2.6	52.1	5.6	60.3	19.2	463
	[0.5-4.7]	[37.4-66.7]	[0.8-10.4]	[46.2-74.3]	[8.8-29.7]	
Zamfara	0.7	57.2	2.8	60.7	19.1	580
	[0.0-1.5]	[43.5-71.0]	[0.2-5.4]	[46.3-75.1]	[7.9-30.4]	

Infant and Young Child Feeding Practices

Feeding practices play a critical role in child development. Poor feeding practices can adversely impact the health and nutritional status of children, which in turn has direct consequences for their mental and physical development, especially in the critical window from birth to 2 years of age. Duration and intensity of breastfeeding also affects the health status of mothers, the period of postpartum fertility and, hence, the length of birth interval and the fertility levels[96]. Ideally, infants should be breastfed within one hour of birth, exclusively breastfed (EBF) for the first six months of life and then continue to be breastfed at least up to two years with age-appropriate, nutritionally adequate and safe complementary foods.

In the NNHS 2018 survey, data on Infant and Young Child Feeding (IYCF) practices was collected for all the children aged 023 months using a 24 hour recall from caregivers. The key aspects of IYCF practices from the WHO/UNICEF core indicators have been examined and reviewed, from early initiation of breastfeeding and exclusive breastfeeding (EBF) to complementary foods introduction, meal frequency, diet diversity and iron supplementation.

Children ever breastfed

This indicator refers to those infants, aged 0-23 months, who have been put to breast, even if only once. The results show that the awareness and practice of breastfeeding is a fairly common practice in Nigeria, with almost 97 percent of children ever breastfed. This finding is consistent with NDHS 2013 survey, NNHS 2014 and MICS 2016-17 report when respectively 95, 97 and 95 percent of children nationwide were reported to have been breastfed at some time. Disaggregated data by zone show that the highest percentage of children ever breastfed is in South South and North West (98 percent), the lowest being North Central (96 percent). At state level, Akwa Ibom, Cross River and Gombe had all (100 percent) the assessed children aged 0-23 months reportedly ever breastfed, while Ekiti has the lowest (84 percent). Katsina which recorded the lowest ever breastfed rate in NNHS 2014 showed the greatest improvement from 89 percent in 2014 to 99 percent this year.

[96]Nigeria Demographic and Health Survey (NDHS) 2013

Early initiation of breastfeeding

Since breastfeeding has so many health benefits for both mother and child, it is fundamental that it begins as soon as possible. Early initiation of breastfeeding contributes to reducing overall neonatal mortality by preventing hypothermia through skin-to-skin contact and fosters bonding between mother and child. Early initiation of breastfeeding also reduces mothers' risk of post-partum haemorrhage as it facilitates the release of oxytocin, which helps the contraction of uterus. Additionally, the milk produced by the mother during the first post-partum days (colostrums) provides protective antibodies and essential nutrients to newborns, thus acting as a sort of first immunization[97]. Therefore it is highly recommended that children be fed colostrum immediately within one hour after birth and that they continue to be exclusively breastfed even if the regular breast milk has not yet started to flow.

Table 28 shows that, in Nigeria, the recommendation to initiate breastfeeding within one hour of birth is met by only 19 percent of children, while early initiation of breastfeeding within one day after birth is about 78 percent. In epidemiological literature, place of delivery, maternal educational attainment, place of residence, and mother's age at birth of the child have been associated with timing of breastfeeding initiation[98]. A study published in 2013 on Child Development Research showed that mothers from the North East zone had the worst breastfeeding initiation behaviour with more than 70 percent of mothers delaying initiation of breastfeeding after childbirth, while North Central and South South mothers had the best breastfeeding initiation experience with only 48 and 53 percent of mothers delaying breastfeeding initiation[99]. Disaggregated data by geo-political zones are consistent with the above findings and with the NNHS 2014 results, showing the percentage of children who initiated breastfeeding within one hour of birth is lowest in South West (8 percent) and North West (13 percent) and highest in South South (43 percent). In conclusion, although some progress has been made by increasing community awareness about the benefits of early breastfeeding, rates in all states surveyed, except Benue (62 percent), Cross River (50 percent) and Delta (49 percent), remain below Sub-Saharan Africa average, where 48 percent of newborns are breastfed within one hour of birth[100].

[97]Tracking progress on Child and Maternal Nutrition, A survival and development priority, Unicef 2009
[98]Factors influencing breastfeeding practices among mothers in Lafia Local government area of Nasarawa State, Nigeria, PAT, vol. 6, 2010
[99]Modelling the Trend and Determinants of Breastfeeding Initiation in Nigeria, Child Development Research, Volume 2013, 2013
[100]UNICEF Global Nutrition Database, 2012, based on MICS, DHS and other national surveys, 2007–2011

Table 28. Breastfeeding practices among children and initiation of breastfeeding after birth of Children 0-23 months by background characteristics

Background Characteristics	Percentage of children 0-23 months who were			Total number of children 0-23 months
	Ever Breastfed	put to breast within the first hour of	put to breast within the first day of	
National	97.1	19.2	77.8	8,124
	[96.7-97.6]	[17.5-21.0]	[76.2-79.4]	
Sex of child				
Male	97.3	18.4	77.6	4,100
	[96.7-97.8]	[16.4-20.4]	[75.7-79.5]	
Female	96.9	20.1	77.9	4,024
	[96.4-97.5]	[18.0-22.1]	[76.0-79.9]	
Age Group				
0-5 months	97.3	20.2	78.4	2,033
	[96.6-98.0]	[17.5-22.8]	[76.0-80.7]	
6-11 months	98.3	18.3	80.9	2,115
	[97.7-98.9]	[16.0-20.7]	[78.6-83.2]	
12-23 months	96.4	19.2	75.8	3,976
	[95.6-97.1]	[17.3-21.2]	[73.8-77.9]	
Zone				
North Central	96.1	25.4	83.3	1,526
	[94.9-97.3]	[21.3-29.5]	[80.6-85.9]	
North East	96.7	16.4	80.3	1,781
	[95.5-97.8]	[13.7-19.1]	[76.9-83.7]	
North West	97.6	13.3	70.8	2,535
	[96.9-98.3]	[10.2-16.3]	[67.1-74.4]	
South East	96.7	18.2	74.0	651
	[95.2-98.1]	[14.6-21.8]	[69.7-78.3]	
South South	97.9	42.8	83.9	859
	[96.7-99.1]	[36.1-49.4]	[80.4-87.4]	
South West	97.2	7.5	79.0	772
	[96.1-98.4]	[5.2-9.7]	[75.2-82.8]	
State				
Abia	99.2	20.6	77.8	126
	[97.7-99.9]	[10.9-30.3]	[69.1-86.5]	
Adamawa	97.1	24.7	91.3	275
	[94.5-99.7]	[17.4-32.1]	[87.8-94.8]	
Akwa-Ibom	99.9	43.7	93.0	158
	[99.9.0-99.9]	[27.0-60.4]	[88.7-97.4]	
Anambra	96.5	16.8	72.0	143
	[93.7-99.3]	[11.0-22.6]	[62.6-81.5]	
Bauchi	93.6	7.8	69.4	359
	[90.7-96.5]	[4.4-11.2]	[61.3-77.5]	
Bayelsa	97.8	44.8	80.6	134
	[95.3-99.9]	[30.8-58.7]	[70.7-90.5]	
Benue	97.6	61.6	82.5	211
	[95.2-99.9]	[54.0-69.8]	[76.0-89.7]	
Borno	97.4	20.8	82.5	269
	[94.7-99.9]	[11.4-30.2]	[69.9-95.1]	
Cross River	99.9	49.7	89.4	161
	[99.9.0-99.9]	[33.9-65.5]	[82.7-96.2]	

Table 28. continued

Background Characteristics	Percentage of children 0-23 months who were			Total number of children 0-23 months
	Ever Breastfed	put to breast within the first hour of	put to breast within the first day of	
Delta	94.1	48.9	80.0	135
	[89.5-98.6]	[34.3-63.5]	[70.2-89.8]	
Ebonyi	89.6	19.5	78.6	154
	[83.1-96.2]	[13.0-26.0]	[69.7-87.5]	
Edo	98.5	24.4	74.1	135
	[96.6-99.9]	[15.0-33.9]	[66.0-82.1]	
Ekiti	83.7	14.7	67.4	129
	[77.6-89.8]	[8.2-21.3]	[60.3-74.5]	
Enugu	97.3	22.1	73.5	113
	[94.3-10]	[13.5-30.7]	[65.1-81.8]	
FCT	96.9	11.9	82.0	194
	[94.0-99.8]	[6.1-17.6]	[73.0-91.0]	
Gombe	99.9	10.1	78.8	335
	[99.9.0-99.9]	[5.2-15.1]	[72.0-85.6]	
Imo	98.3	13.9	71.3	115
	[96.0-99.9]	[5.8-22.0]	[61.0-81.6]	
Jigawa	94.2	8	66.7	414
	[92.2-96.2]	[3.4-12.6]	[54.6-78.7]	
Kaduna	95.5	5.7	73.6	246
	[92.7-98.3]	[0.0-12.1]	[62.1-85.0]	
Kano	99.4	30.3	71.4	343
	[98.7-99.9]	[23.3-37.3]	[64.5-78.3]	
Katsina	99	5.5	66.8	398
	[98.1-99.9]	[2.4-8.7]	[57.2-76.4]	
Kebbi	98.1	4.6	83.1	366
	[96.8-99.4]	[1.9-7.4]	[76.8-89.3]	
Kogi	94.2	11.5	87.2	156
	[90.8-97.7]	[7.0-16.0]	[81.6-92.8]	
Kwara	88.5	10.9	79.2	183
	[82.6-94.4]	[5.5-16.3]	[72.4-86.0]	
Lagos	99.3	3.4	77.2	145
	[98.0-99.9]	0.2-6.7	[68.7-85.8]	
Nasarawa	97.4	30.5	88.4	190
	[95.5-99.3]	[21.9-39.2]	[83.5-93.4]	
Niger	97.2	12.0	82.1	357
	[95.6-98.8]	[8.1-16.0]	[76.6-87.6]	
Ogun	98	1.3	79.3	150
	[95.2-99.9]	[0.0-3.1]	[71.0-87.7]	
Ondo	98.3	17.2	75.0	116
	[95.9-99.9]	[8.0-26.5]	[66.2-83.8]	
Osun	95.6	20.0	78.9	90
	[91.7-99.4]	[11.3-28.7]	[71.9-85.8]	
Oyo	99.3	2.1	89.4	142
	[97.9-99.9]	[0.0-4.4]	[83.8-95.0]	
Plateau	99.2	31.4	82.6	236
	[98.1-99.9]	[22.2-40.5]	[75.5-89.8]	
Rivers	97.8	44.1	83.8	136
	[95.4-10]	[28.6-59.6]	[76.0-91.6]	

Table 28. continued

Background Characteristics	Percentage of children 0-23 months who were			Total number of children 0-23 months
	Ever Breastfed	put to breast within the first hour of	put to breast within the first day of	
Sokoto	96.8	5.2	71.8	347
	[95.0-98.6]	1.9-8.5	61.9-81.6	
Taraba	96.6	27.8	89.7	234
	[93.6-99.6]	[21.8-33.7]	[85.2-94.3]	
Yobe	98.1	12.6	76.1	309
	[96.2-99.9]	[7.8-17.5]	[67.3-84.8]	
Zamfara	98.8	17.1	64.1	421
	[97.3-99.9]	[9.6-24.6]	[56.6-71.6]	

Exclusive breastfeeding

Exclusive breastfeeding (EBF) refers to the proportion of infants 0–5 months of age, which are fed exclusively with breast milk. Specifically it is defined as no other food or drink, not even water, except breast milk (including milk from a milk bank or wet nurse) for the first 6 months of life, but allows the infant to receive ORS, drops and syrups (vitamins, minerals and medicines).

UNICEF and WHO recommend that children be exclusively breastfed (no other liquid, solid food, or plain water) during the first six months of life, since breast milk contains all the nutrients needed. Apart from being nutritionally inadequate, substitutes – such as formula, other kinds of milk, and/or porridge – can be contaminated, exposing infants to the risk of illness, thus increasing their risk of mortality. Introducing substitutes before the age of 6 months can also discourage breastfeeding, which, for many reasons, should be continued at least up to 2 years of age. According to Lancet, an exclusively breastfed child is 14 times less likely to die in the first six months than a non-breastfed child, and breastfeeding drastically reduces deaths from acute respiratory infection (ARI) and diarrhoea, two major child killers[101].

Despite the importance of breast milk, overall only 28 percent of infant under-six months were exclusively breastfed, a percentage consistent with the 2014 NNHS findings of 25 percent but far below the recommended WHO/UNICEF level of 50 percent. The NNHS 2014 findings also showed that proportion of children exclusively breastfed sharply decreases with age from birth to the second-third month and towards the sixth month of life. This finding is also consistent with NDHS 2013, which indicates that half of all Nigerian infants are not exclusively breastfeed not even for a month. Finally, there is no bias in EBF rates, since males and females are equally breastfed (27.1 vs 27.3 percent).

[101]The Lancet Series, September 2008, vol. 372 No. 9642

Table 28 also shows considerable geographical variations in the practice of Exclusive Breastfeeding (EBF). The likelihood of exclusively breastfeeding children is significantly higher in the South West (36 percent) than in the North West (12 percent). Although the samples at state levels are too low for any meaningful statistical presentation, continued and much more intensive intervention is needed in the North Western states – Sokoto, Zamfara, Kebbi, Kaduna, Katsina, Kano and Jigawa, and other states in South East and North East where EBF rates are lower than 25 percent – to promote, protect and support exclusive breastfeeding until 6 months of age.

Continued Breastfeeding

As stated above, beside EBF until six months, optimal breastfeeding practices include continued breastfeeding up to at least two years of age – alongside appropriate complementary foods introduction. Table 29 reports data on continued breastfeeding for children 12-23 months by background characteristics. Overall, children still breastfed at one year are 84 percent, while only 24 percent of children aged 20 months and above are still breastfed. Comparatively, the MICS 2016-17 also reported continued breastfeeding rates of 86 percent and 37 percent at 1 year and at 2 years respectively. These findings show an improvement from the 2014 rates when breastfeeding rates were 77 and 20 percent at 1 year and at 2 years respectively[102]. The findings are also consistent with those of DHS 2013, where mean duration of breastfeeding was about 18 months. At zonal level, North West zone reported the highest prevalence of continued breastfeeding at 12-15 months and at 20-23 months (95 and 35 percent respectively). Conversely only 61 percent of the children in South East were still breastfeeding at 1 year, and the rate drops to the lowest level of 4 percent at 2 years. No significant difference between sexes was reported.

[102]The 2015 NNHS did not collect information on IYCF, and so comparison is done only to 2014 NNHS.

Table 29: Exclusive Breastfeeding and Continued Breastfeeding at 1 year by Zone and State

Background Characteristics	Percent exclusively breastfed	Children 0-5 months	Percent continued breastfed at 1 year	Children 12-15 months	Percent continued breastfed at 2 years	Children 20-23 months
National	27.2	2,033	84.1	1,334	23.5	1,337
	[24.5-30.0]		[81.4-86.9]		[20.4-26.6]	
Sex of child						
Male	27.1	1,016	84.1	662	21.4	689
	[23.6-30.6]		[80.2-88.0]		[17.6-25.1]	
Female	27.3	1,017	84.2	672	25.9	648
	[23.7-30.9]		[80.5-87.8]		[21.8-30.0]	
Zone						
North Central	34.7	406	89.4	243	35.3	220
	[29.5-39.8]		[85.1-93.8]		[27.3-43.3]	
North East	23	468	91.1	314	32.1	273
	[18.1-28.0]		[87.8-94.4]		[25.8-38.5]	
North West	14.3	602	95	421	34.7	457
	[9.7-18.8]		[92.7-97.4]		[29.0-40.5]	
South East	22.4	179	60.5	104	4.1	103
	[15.8-29.0]		[50.4-70.5]		[0.4-7.8]	
South South	34.1	213	76.9	131	10.6	137
	[26.4-41.8]		[68.3-85.4]		[4.9-16.3]	
South West	40.1	165	78.2	121	15.1	147
	[31.6-48.6]		[69.6-86.9]		[8.2-22.1]	

Minimum dietary diversity

Dietary diversity relates to nutrient adequacy (coverage of basic needs in terms of macro and micro nutrients) and to diet variety/balance, which are two of the main components of diet quality. In terms of children aged 6 to 23 months, it means feeding food from at least four out of seven food groups[103], a cut-off selected because of its association with better quality diets for both breastfed and non-breastfed children. The cut-off at "at least 4 of the 7 food groups" is generally associated with better quality of diets. In fact, in most populations, consumption of foods from at least 4 food groups means that the child had a high likelihood of consuming at least one animal source food and at least one vitamin A-rich fruit or vegetable that day, in addition to a staple food (grain, roots or tuber)[104].

The minimum dietary diversity (consumption of at least four groups among of seven per day) varies significantly and increases with age. Overall, 35 percent of children aged 6-23 months consumed 4 or more food groups; and the consumption increases significantly with age, from 11 percent among children aged 6-8 months to 48 percent for children in the 18-23 months group.

Across zones, the minimum number of food groups consumed showed some variability. The highest prevalence of minimum dietary diversity in compliance with IYCF recommendation is observed in the South East, and the proportion there (49 percent) is more than double the prevalence found in the North West (24 percent). At state level, less than one in five children living in Bauchi, Gombe, Katsina and Ondo met the minimum dietary diversity during the previous day, as compared to children living in Enugu, Nasarawa and Anambra, where at least two out of five children (6-23 months) consumed the at least 4 food groups (Table 30).

Minimum meal frequency

Minimum meal frequency is defined as the proportion of breastfed – and non-breastfed children –aged 6 to 23 months who received solid, semi-solid, soft foods – or milk feeds – the minimum number of times or more during the previous day. These minimum feeding frequencies are based on the energy needs estimated from age-specific total daily energy requirements. To be considered acceptable, breastfed infant age 6-8 months should be fed meals of complementary foods two to three times per day, with one to two snacks as desired; breastfed children age 9-23 months should be fed meals three to four times per day, with one to two snacks. Non-breastfed children should be fed

[103]The seven food groups used to calculate this indicator are: grains, roots and tubers; legumes and nuts; dairy products; flesh foods; eggs; vitamin A rich fruit and vegetables; other fruits and vegetables
[104]Dietary Diversity Is Associated with Child Nutritional Status: Evidence from 11 Demographic and Health surveys, The American Society for Nutritional Sciences Journal of Nutrition 2004

meals four to five times per day, with one to two snacks as desired. Meal frequency is considered a proxy for energy intake from foods other than breast milk; therefore, the feeding frequency indicator for non-breastfed children includes both milk feeds and solid/semisolid feeds. Infants with low breast milk intake would need to be fed more frequently. However, overly frequent feeding may lead to displacement of breast milk[105].

The result from the entire survey domain showed that only 40 percent of children 6-23 months were fed the recommended number of times during the 24 hours preceding the interview. Disaggregated data by zone show a high degree of variability, ranging from 27 percent in South South to 49 percent in North Central (Table 30). At state level, children in Rivers have the lowest meal frequency (13 percent), while children in Benue have the highest (59 percent).

Rates of complementary feeding indicators even among the breastfed children only, did not show significant variation among age groups; sexes and overall rates (Table 30).

[105]Guiding Principles for Complementary Feeding of the Breastfed Child, PAHO, 2003

Table 30: Complementary Feeding Practices among Children 6-23 months by Zone and State

Background Characteristics	Percentage of children (6-23 months) who consumed:				Number of children 6-23 Months
	Minimum Dietary Diversity	Minimum Meal Frequency	Minimum Acceptable Diet	Iron-rich/ fortified foods	
National	34.5	40.2	16.5	45.6	6,091
	[32.6-36.4]	[38.3-42.0]	[15.1-17.9]	[43.4-47.8]	
Sex of child					
Male	34.1	40.8	16.4	45.1	3,084
	[31.8-36.4]	[38.4-43.2]	[14.6-18.2]	[42.5-47.7]	
Female	34.9	39.5	16.6	46.1	3,007
	[32.5-37.4]	[37.2-41.8]	[14.8-18.4]	[43.5-48.7]	
Age Group					
6-8 months	11.3	52.3	9.6	26.5	967
	[8.7-3.9]	[48.4-56.1]	[7.2-12.1]	[22.7-30.3]	
9-11 months	26.2	36.9	13.2	38.1	1,148
	[22.8-29.6]	[33.2-40.6]	[10.8-15.7]	[34.4-41.9]	
12-17 months	37.0	39.5	18.2	47.5	1,958
	[34.0-39.9]	[36.6-42.4]	[16.0-20.5]	[44.3-50.8]	
18-23 months	48.0	36.8	19.9	57.1	2,018
	[44.9-51.0]	[33.9-39.7]	[17.5-22.4]	[53.9-60.3]	
Non Breastfeeding	52.3	27.3	16.8	64.8	1,768
	[49.0-55.7]	[24.4-30.3]	[14.4-19.2]	[61.5-68.0]	
Breastfeeding	26.7	47.1	16.8	36.9	4,323
	[24.8-28.7]	[44.9-49.4]	[15.2-18.4]	[34.6-39.3]	
Zone					
North Central	38.0	48.9	20.0	47.0	1,120
	[33.8-42.2]	[44.8-53.0]	[16.8-23.2]	[42.5-51.4]	
North East	27.1	43.8	17.3	23.9	1,313
	[23.5-30.8]	[39.3-48.2]	[14.0-20.7]	[20.5-27.2]	
North West	24.0	35.9	12.1	24.0	1,933
	[21.0-26.9]	[32.5-39.3]	[10.0-14.2]	[20.7-27.3]	
South East	49.6	47.4	23.4	77.1	472
	[44.1-55.2]	[41.8-53.0]	[19.0-27.7]	[73.1-81.1]	
South South	42.5	27.1	12.8	68.3	646
	[36.5-48.4]	[22.3-31.9]	[9.2-16.4]	[63.4-73.2]	
South West	36.5	42.6	18.1	53.0	607
	[31.9-41.0]	[37.8-47.4]	[14.1-22.2]	[48.1-57.8]	
State					
Abia	45.8	37.5	21.9	75.0	96
	[34.4-57.3]	[26.8-48.3]	[12.1-31.6]	[67.0-83.0]	
Adamawa	43.1	57.9	35.5	33.0	197
	[31.7-54.6]	[45.3-70.5]	[24.8-46.3]	[23.1-42.9]	
Akwa-Ibom	38.2	24.4	9.8	63.4	123
	[25.3-51.1]	[14.7-34.0]	[2.3-17.3]	[51.2-75.7]	
Anambra	60.4	44.1	23.4	82.9	111
	[49.6-71.1]	[31.4-56.9]	[14.5-32.3]	[76.1-89.6]	

Table 30: continued

Background Characteristics	Percentage of children (6-23 months) who consumed:				Number of children 6-23 Months
	Minimum Dietary Diversity	Minimum Meal Frequency	Minimum Acceptable Diet	Iron-rich/ fortified foods	
Bauchi	12.8	43.6	7.0	13.9	273
	[8.9-16.8]	[34.1-53.1]	[3.6-10.3]	[9.1-18.8]	
Bayelsa	34.7	20.4	7.1	59.2	98
	[23.3-46.1]	[11.4-29.4]	[1.2-13.1]	[46.0-72.4]	
Benue	32.3	60.0	20.0	50.3	155
	[21.4-41.8]	[51.1-68.9]	[11.2-28.8]	[39.1-61.6]	
Borno	35.8	44.3	18.4	32.8	201
	[24.6-47.0]	[34.3-54.3]	[8.8-28.1]	[23.9-41.8]	
Cross River	44.4	29.8	18.5	65.3	124
	[28.8-60.0]	[16.0-43.7]	[5.4-31.7]	[52.5-78.1]	
Delta	49.0	27.6	13.3	73.5	98
	[35.1-62.8]	[15.0-40.1]	[6.1-20.4]	[62.0-84.9]	
Ebonyi	39.2	57.8	16.7	64.7	102
	[29.1-49.3]	[46.2-69.4]	[10.6-22.8]	[56.2-73.2]	
Edo	48.5	51.5	28.3	68.7	99
	[35.4-59.6]	[39.9-63.1]	[17.4-39.2]	[60.4-77.0]	
Ekiti	28.7	32.7	8.9	54.5	101
	[18.7-36.7]	[24.0-41.4]	[2.1-15.7]	[43.9-65.0]	
Enugu	50.0	63.8	35.0	71.3	80
	[38.2-61.8]	[54.6-72.9]	[24.3-45.7]	[61.6-80.9]	
FCT	33.1	33.1	13.4	54.2	142
	[23.4-41.4]	[21.5-44.7]	[6.7-20.1]	[43.2-65.3]	
Gombe	12.2	33.3	4.2	8.9	237
	[6.9-16.8]	[24.0-42.7]	[0.8-7.6]	[4.7-13.0]	
Imo	45.8	39.8	18.1	83.1	83
	[31.6-57.6]	[29.0-50.5]	[10.7-25.5]	[74.3-91.9]	
Jigawa	26.2	40.7	13.9	28.7	317
	[17.0-34.7]	[31.1-50.3]	[6.8-20.9]	[19.1-38.3]	
Kaduna	28	42.9	12.7	23.3	189
	[20.0-35.0]	[33.0-52.7]	[7.4-18.0]	[14.6-32.0]	
Kano	31.3	31.7	14.4	25.5	243
	[22.1-37.2]	[25.1-38.3]	[9.1-19.7]	[17.3-33.8]	
Katsina	12.5	28.9	7.1	11.6	311
	[7.1-17.4]	[21.4-36.5]	[3.4-10.8]	[6.0-17.1]	
Kebbi	26.4	45.7	13.9	37.1	280
	[19.4-31.3]	[35.4-56.1]	[9.1-18.8]	[27.7-46.6]	
Kogi	40.7	48.7	20.4	53.1	113
	[29.4-52.0]	[40.7-56.7]	[12.1-28.6]	[40.8-65.4]	
Kwara	45.4	45.4	15.4	54.6	130
	[37.0-52.3]	[34.0-56.8]	[8.8-21.9]	[43.3-65.9]	
Lagos	43.1	42.2	18.3	58.7	109
	[32.4-50.1]	[32.2-52.2]	[10.2-26.5]	[49.0-68.5]	
Nasarawa	51.9	58.5	37.8	45.2	135

Table 30: continued

Background Characteristics	Percentage of children (6-23 months) who consumed:				Number of children 6-23 Months
	Minimum Dietary Diversity	Minimum Meal Frequency	Minimum Acceptable Diet	Iron-rich/ fortified foods	
Niger	31.0	47.8	18.3	41.8	268
	[22.9-39.0]	[38.0-57.5]	[11.2-25.4]	[32.7-50.9]	
Ogun	46.4	52.8	27.2	59.2	125
	[37.0-55.8]	[42.4-63.2]	[18.6-35.8]	[50.1-68.3]	
Ondo	11.0	37.4	3.3	46.2	91
	[4.1-17.9]	[26.2-48.5]	[0.0-6.7]	[37.2-55.1]	
Osun	27.8	45.8	20.8	56.9	72
	[15.1-40.5]	[32.1-59.6]	[8.5-33.1]	[43.4-70.5]	
Oyo	46.8	42.2	23.9	40.4	109
	[36.9-56.6]	[32.4-52.0]	[13.7-34.0]	[28.5-52.3]	
Plateau	45.2	47.5	21.5	33.3	177
	[32.8-57.6]	[35.8-59.1]	[14.6-28.3]	[21.8-44.9]	
Rivers	39.4	15.4	4.8	72.1	104
	[25.6-53.2]	[8.5-22.2]	[0.4-9.2]	[61.8-82.4]	
Sokoto	22.8	30.5	9.7	26.6	259
	[14.9-30.7]	[21.3-39.7]	[4.7-14.6]	[18.3-35.0]	
Taraba	46.3	46.9	29.7	33.1	175
	[39.6-51.9]	[40.3-53.4]	[23.2-36.2]	[23.9-42.3]	
Yobe	22.2	30.9	12.2	27.8	230
	[15.7-27.8]	[22.1-39.7]	[6.6-17.8]	[19.1-36.5]	
Zamfara	21.9	35.9	12.0	21.6	334
	[15.6-27.5]	[27.7-44.2]	[7.6-16.3]	[14.9-28.2]	

Minimum acceptable diet

Because appropriate feeding of children 6–23 months is multidimensional, it is important to have a composite indicator that tracks the extent to which these feeding dimensions are being met. Therefore the minimum acceptable diet indicator combines standards of dietary diversity and feeding frequency by breastfeeding status. For breastfed children it means considering only those children aged 6 to 23 months who have received both the minimum dietary diversity and the minimum meal frequency in the last 24 hours. However, this indicator is slightly different for non-breastfed children. Dietary diversity is calculated by using six food groups (excluding dairy products) at least four times a day and combining milk related products (formula milk, milk or yoghurt) at least two times in the day. When both of these criteria are met, the conditions for minimum meal frequency of non-breastfed children are met.

Table 30 shows that overall, only 17 percent of children age 6-23 months (breastfed and non-breastfed) received the minimum acceptable diet during the previous day, reflecting the generally poor IYCF practices in the country. The percentage tends to increase with age too– from 10 percent

at 6-8 months to 20 percent at 18-23 months respectively. This trend is similar to minimum dietary diversity and minimum meal frequency, suggesting younger children (6–11 months) are the most vulnerable group for not meeting the recommended IYCF practices. The national rates are not different when only the breastfed group is considered (16.8 percent for breastfed vs 15.8 percent for non-breastfed group).

The lowest percentage of children who consumed the minimum acceptable diet is reported in the North West (12 percent), while the highest is in the South East, nearly double (23 percent) but still low. The situation is particularly critical in four states: Bauchi, Bayelsa, Gombe, Ondo, Katsina, Rivers, Sokoto, where fewer than one in ten children consumed the minimum acceptable diet. Conversely, the highest percentage is reported in Adamawa state (36 percent) followed by Enugu (35 percent).

These percentages are consistent with the geographic distribution of malnutrition observed in Nigeria and show that IYCF practices are worse in the North West and North East zones compared to the Southern zones; younger children, aged 6 to 8 months (the age of introduction to solid and semi solid complementary foods), are generally more at risk than older children, having consumed less diverse and acceptable diets.

Consumption of Iron-rich or Iron Fortified Foods

Micronutrient deficiency is a major contributor to childhood morbidity and mortality. Children can receive micronutrients from foods, food fortification, and direct supplementation. Iron is essential for red blood cell formation and cognitive development, and low iron intake can contribute to anaemia[106]. Iron requirements are greatest at age 6-23 months, when growth is extremely rapid.

The results of the survey (Table 30) show that overall 46 percent of children 6-23 months consumed iron rich food or iron fortified food in the 24 hours prior to the survey. Among zones, the proportion of children 6 to 23 months who consumed iron ranges from 24 percent in the North East and North West to 77 percent in the South East, a finding consistent with the other three IYCF indicators, and with the NNHS 2014 findings. Very low intakes (less than 20%) of iron rich foods were reported in three states: Gombe, Katsina, and Bauchi, whereas in Abia, Anambra, and Imo, more than three fourth of children had adequate intakes of iron rich foods.

It should also be noted that iron consumption increases with age of children, ranging from 27 percent at 6-8 months to 57 at 18-23 months of age.

[106]In Nigeria, rates of anemia among preschool aged children used to be as high as 76 percent. Worldwide Prevalence of Anemia: 1993-2005: WHO Global Database on Anemia, WHO 2008.

Limitations, Potential Biases and Challenges Faced

Reliability of the sampling frame

The master sampling frame used for the random selection of Primary Sampling Units (Enumeration Areas) was developed in 2005. As the projections at EA levels are technically difficult to obtain, the choice is made to use the original population estimates for the cluster selection when applying the PPS method. A pre-survey household listing exercise helped in the household population update but this was not completed in all states. In some EAs the Household listing was not properly conducted in sequence or exhaustively, leading to missing of some households or misplacing some households into neighbouring EAs. In such instances, the teams had to take much longer time to have a quick pre-listing exercise before selecting and identifying the required number of households to survey in the cluster.

Reliability of the EA maps

The mapping of the enumeration areas dated from 2006 census and some boundaries changed since that time. The NPoC provided updated maps after the pre-survey household listing exercise but some of these were still inaccurate. In such instances the teams took long time to locate their clusters to survey. However, efforts were made to locate the correct location using staff from National Population Commission and the supervisors, and conduct a fresh and quick listing where necessary before selection of households to survey.

Sample size

The sample size for the survey is calculated using a prevalence of Global Acute Malnutrition (GAM) based on children age 6-59 months. This sample size was validated for estimates of most of the indicators based on the 0-59 or 6-59 month age range. Indicators with narrow age range were also validated to produce estimates with reasonable precision for each survey domain. The indicators with very narrow age group and very low prevalence were estimated at zonal level by pooling the data from the survey domain within the particular zone. It was not possible to provide precise estimates for these types of indicators at state level.

Insecurity

Due to prevailing insecurity and sporadic incidences witnessed in some areas in a few states at the time of the survey, some clusters could not be reached or surveyed. In total, 10 clusters out of the planned 1332 were not accessed, mostly in Benue (2), Kogi (2), Nasarawa (2), Edo, Taraba, Zamfara and Sokoto (1 each). This number, however, was within the allowable non-response provisions in the

sampling design and therefore the results are still valid and representative of the respective states. In Borno, where insecurity by Boko Haram is prevalent, data collection was delayed due to the logistics of identifying the accessible EAs, and when this was done, only 56 percent of the population was included in the sampling frame. The findings for Borno, thus does not represent the whole state but just the accessible half of the state. However, adequate weighting has been done to generate representative zonal, gender, age, and national rates.

Conclusions and Recommendations

The Global Nutrition Report (GNR) 2015 places Nigeria among the countries displaying commitment to reduce hunger and improve children and women nutrition. Although it still is one of the five large low-middle income countries where more than half of children under age 5 are either stunted or wasted, the trends in meeting the global WHAR targets are positive and Nigeria is obtaining "some progress"[107].

Survey results show improvements in consistence with the GNR 2015 findings in some key indicators, stagnation on this progress in some and deterioration in others compared to other studies including MICS 2016-17 and to the NNHS findings of 2015 and of 2014. The national GAM prevalence of 7.0 percent (95% CI: 6.5-7.5) with SAM rate of 1.5% (95% CI: 1.3-1.7) indcate that acute malnutrition levels have remained at alert levels of 5-9.9% over the years since 2014. Underweight, at 19.9 percent (95% CI: 21.5-23.4) has generally remained at the margin or slightly above the 20 percent threshold for serious situation, higher than the global estimate of 15 percent but consistent with the rates in the West and Central Africa region (22%); however, the prevalence of stunting of 32.0 percent (95% CI: 30.7-33.4) in 2018 has remained highest form of malnutrition with stagnated rates of above 30 percent since 2014, and with many states in the north west and north east recording prevalence above 40 percent, the WHO critical levels. Stunting therefore remains the largest burden, indicating a long term nutritional problem in the country as is in Sub-Saharan region (37 percent). In terms of overweight, national prevalence has not changed since 2014 and the prevalence (1.2 – 1.6 percent) is below the 7 percent threshold in all the 37 domains. The prevalence of children under 5 years who are neither stunted nor wasted is 64 percent.

Beside children from northern geopolitical zones, other categories more at risk appear to be boys (as compared to girls) and younger children (less than 2 years old). Interventions in the critical window of first 1,000 days of life and a greater focus on boys in nutrition assessment, programming, and policy is highly advised. Similarly, the teenage women (15-49 years) are at a higher malnutrition and reproductive health risk than their older counterparts (20-49 years). These results sound a warning to all stakeholders, that efforts to invest on nutrition should be maintained especially in the northern states to avoid losing out on the gradual gains made in the past and to bring down acute and chronic malnutrition levels to below 5 percent and 20 percent respectively as envisaged in the national and international goals[108].

[107]The other four countries are Bangladesh, Democratic Republic of the Congo, Ethiopia, and Pakistan. 2015 Global Nutrition Report, International Food Policy Research Institute, 2015.
[108]Sustatainable development goals (2030 SDGs).

The IYCF practices are still poor in the country. Four out of five new-borns do not receive milk within one hour of birth and so do not get the protective colostrums; only one in four children under six months is exclusively breastfed – despite the recommended WHO/UNICEF level of one in two children; and fewer than two in ten children aged 6-23 months receives the minimum acceptable diet. Considering that under nutrition in the first 2 years of life impacts largely on future physical and mental growth, it is imperative to inform, encourage and support women (and their families) to adopt optimal feeding practices for their children, firstly by breastfeeding longer and secondly by appropriately introducing and providing complementary semi-sloid and solid foods according to their age. Interventions such as Maternal New-born and Child Health Weeks (MNCHW) should be implemented and improved to reach more children.

The situation shows the same picture with regards to the nutritional status of women. The geographical distribution of women with acute malnutrition is consistent with previous nutrition survey (2015) but has deteriorated since 2014. Overall, 7 percent of Nigerian women of reproductive age were reported as malnourished (MUAC < 221 mm) and 4 percent as severely malnourished (MUAC < 214 mm), same rates as in 2015 when the prevalence of global acute malnutrition and severe acute malnutrition were at 5 and 2 percent respectively (NNHS 2014). Although the levels of acute malnutrition remained stable in most states, five states (Ebonyi, Ekiti, FCT, Ondo, and Osun) showed significant deterioration with more than 50% increase in prevalence compared to NNHS 2015. Further investigation is therefore needed to understand the reasons for such changes of malnutrition indicators among women of reproductive age in these states.

According to survey results, younger mothers appear more disadvantaged nutritionally. Emerging research shows the importance of the nutrition of adolescent girls for birth outcomes and subsequent nutrition throughout the lifecycle[109], making it very urgent to develop effective interventions for the adolescent preconception period. Improving nutrition in adolescent girls is critical to improving the nutrition status of the entire population of Nigeria.

Reproductive health indicators follows the women malnutrition pattern with Southern states (and older women) reporting better rates in terms of skilled attendance at delivery, use of contraceptive methods, antenatal care (ANC) coverage and HIV testing during ANC. Specific family planning programs to diffuse awareness of skilled birth attendants and ANC, HIV testing and contraceptive benefits are highly advised, especially in the North West and North East, where almost one in six women was found pregnant, but 70-80 percent of all pregnant women did not receive skilled care during childbirth, only 5-8 percent used any contraceptive method, and 30-40 percent did not attend the prescribed ANC.

[109]Mother's nutritional status at the time of conception can influence her child's epigenome, with likely lifelong implications. Maternal nutrition at conception modulates DNA methylation of human metastable epialleles, Dominguez-Salas et al., Nature, 2014.

The water and sanitation indicators are still sub-optimal in Nigeria, with huge variations by geopolitical zone and state. Nationally, 57 percent of households were reported to have access to an improved source, a slight improvement from 52 percent in 2015; and only 47 percent have access to improved sanitation facility. Furthermore, only half (53 percent) of the children aged 0 to 3 years have their faeces disposed safely through use of toilet, rinsing into latrine/toilet or burying. South South, South West, and North West have the highest proportions of improved water source, improved sanitation facilities and safe child waste disposal respectively; while North East, North East (again) and North Central reported the lowest respective percentages for these public health indicators.

In terms of children's health, Penta3 coverage for children aged 12-23 months was low at 57 percent as was in 2014 (52 percent), but an increase from 49 percent in 2015. North West (29 percent) and North East (49 percent) continue to record low coverage below 50 percent since 2014. Coverage has been reducing gradually in North central from 55 percent in 2014 to 50 percent in 2018. On a positive note measles vaccination coverage improved across the zones and nationally to 65 percent from 51 percent nationally but remained in the range of 51-65 percent since 2014. However one in three eligible children still received no measles vaccine at all, despite it being part of the services offered in the bi-annual MNCHWs campaigns in Nigeria to boost vaccination coverage.

It is important to note that immunisation data are prevalently based on mothers' (caregivers) recall, therefore poor measles immunisation coverage could be due to the time lapse between the MNCHW/measles campaign, if conducted, and survey data collection. A national measles campaign delivered in late 2013 had increased the coverage as seen in 2014 findings but since then the rates have stagnated. It is therefore critical that campaign to improve immunisation coverage is maintained particularly in the North East and North West of Nigeria, where polio campaigns are conducted frequently.

Vitamin A supplementation coverage was 41 percent, as in 2015 (42 percent), and so nearly six in ten Nigerian children do not receive adequate levels of supplementation and are at risk for vitamin A deficiency. Only two states (Osun -87 percent and Jigawa -74 percent) had coverage the UNICEF prescribed 70 percent threshold; this is a deterioration from 2015 and 2014 when five and seven states had coverage above 70 percent. Younger children seem to be at greater risk of VAD, and so it is vital to continue monitoring the supplementation programme progresses. National coverage for deworming was 40 percent among children age 12-59 months and ranged from 26 percent in North West to 60 percent in South East. At the state level, coverage varied from as low as 8 percent in Sokoto and as high as 76 percent in Imo. Deworming coverage over 50 percent was reported in ten states – Imo, Abia, Lagos, Jigawa, Anambra, Yobe, Osun, Ekiti, Oyo and Rivers, an improvement from 2015 when only six states – Abia, Anambra, Edo, Imo, Lagos, and Ogun had coverage above 50 percent. These results are based on mother's recall and should thus be interpreted with caution but

states with more concern should be supported to improve coverage of deworming to treat worm infections, which happens to be consistently high in Sub-Saharan Africa.

Only one quarter of the 15 percent children under 5 years who reported to have had diarrhoea in the two weeks preceding the survey were treated with ORS (26 percent) or Zinc (24 percent), an equal proportion but a variation from the previous results in 2015 when more children received ORS (21 percent) than zinc tablets (6 percent). Mothers and/or caregivers are probably getting more informed and taking up the zinc treatment regimen for diarrhea as recommended by the Federal Ministry of Health. More than half of children with diarrhoea were aged 6-23 months, while only 9 percent of children aged less than 6 months reported diarrhoea in the two weeks preceding the survey, implying that complementary feeding introduction – and food hygiene – is a very delicate transition period and continued breastfeeding until age of 2 years is highly recommended.

Women's and children's health findings are consistent with low Maternal New-born and Child Health Weeks (MNCHW) campaigns coverage. According to survey results, overall, only 30 percent of households surveyed lived in an area where a MNCHW campaign was implemented, and only 16 percent received some MNCHW services. Households located in the South West had the highest campaigns and chance of benefitting from MNCHW services than those in South East (19 vs 7 percent). Only 32 percent received services at the health facility and nearly two-thirds of the MNCHW services were received in other sites out of the health facility such as markets, church/mosque, or schools. No MNCHW services were received in the houses reflecting the policy guidelines for MNCHW to be offered to the masses in public placesand not at families' own houses. Considering all health indicators reviewed, MNCHWs should definitely be implemented and improved to reach more women and children.

Ownership and utilization of mosquito nets for malaria prevention is still sub-optimal. While 62 percent of the surveyed households possess at least one mosquito net; only 37 percent of children slept under net the previous night. Despite the prevalent fever incidences in children (22 percent) and WHO recommendations for prompt diagnosis and treatment, only 13 percent of them had Rapid Diagnostic Testing (RDT); and only 41 percent of all the children under age 5 who had fever were given an anti-malarial treatment including 17 percent who received Artemisinin-combination therapies (ACTs), which should be the first line treatment for malaria[110]. Post distribution educational campaign should therefore be incorporated into future distribution campaigns to help increase net utilisation.

[110]Far below the national target of at least 80 percent as specified in the National Malaria Strategic Plan.

For the control of malaria, the National Strategic Plan also recommends early case management against the adverse consequences of malaria in pregnancy with three or more doses of sulphadoxin pyrimethamine (SP)/Fansidar. However, a decade after the policy recommendation, the coverage of intermittent preventive treatment of malaria in pregnancy (IPT) use during pregnancy is still very low and only 9 percent of women aged 15-49 years who had a live birth during the two years preceding the survey took SP/Fansidar three or more times during ANC as recommended, a slight increase from 6 percent in 2015.

Variations continue to show in these indicators by geopolitical zones, states and child age. The gap between Northern and Southern zones persist, and the problem becomes even more pronounced when comparing the female gender in these zones with the rest of the country[111]. In the light of this and other survey findings, policy and programme implementation should discourage a "one size fit all" approach and ensure specific focus by zone, state and age groups. In this regard, it would be strongly advised to follow WHO latest recommendations for reducing malnutrition. Given that most, if not all, countries affected by malnutrition lack the resources to fully and immediately scale up all necessary interventions, the most cost-effective scenario should be to scale up a subset of these interventions in the highest-burden regions of the country. This scenario is estimated to be between 1.5 and 3.3 times more cost-effective than scaling up all 10 interventions nationwide[112].

[111]Patterns of Inequality in Human Development Across Nigeria's Six Geopolitical Zones, Developing Countries Studies, IISTE, 2014

[112]The World Bank, with support from the Bill & Melinda Gates Foundation, has been working to assess cost-effectiveness of nutrition-specific interventions that have been shown to be effective in reducing malnutrition in five countries. These studies have analysed the costs of scaling up 10 nutrition-specific interventions according to three different settings, and then linked these costs to expected impacts, including lives saved, cases of stunting averted, and disability-adjusted life years saved. Possible scenario were: (1) focusing on only the regions with the highest burden of malnutrition, (2) scaling up only a subset of interventions, and (3) scaling up a subset of interventions only in the regions with the highest burden of malnutrition. Given that most, if not all, countries lack the resources to fully and immediately scale up all interventions, the most cost-effective scenario was found to scale up a subset of the 10 interventions in the highest-burden regions of the country. This scenario would be between 1.5 and 3.3 times more cost-effective than scaling up all 10 interventions nationwide. Disease Control Priorities. In Developing Countries – Bill & Melinda Gates Foundation and WHO.

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Annexes

Annex 1: Data Quality - Plausibility Scores

State		Flags (SMART)		Overall Sex Ratio (x^2)		Age Ratio (6-29: 30-59 Mo (x^2)		DPS - Wt		DPS - Ht		DPS - MUAC		SD WHZ		Skewness WHZ		Kurtosis WHZ		Poisson distribution SMART WHZ<-2 (x^2)		Overall Score	
	Name	%	Score	*p*	Score	*p*	Score	#	Score	#	Score	#	Score	SD	Score	#	Score	#	Score	*p*	Score	%	Quality
1	Abia	2.0	**0**	0.552	**0**	0.759	**0**	6	**0**	7	**0**	8	**2**	0.97	**0**	0.09	**0**	0.27	**1**	0.004	**3**	6	Excellent
2	Adamawa	1.0	**0**	0.930	**0**	0.134	**0**	4	**0**	6	**0**	7	**0**	1.03	**0**	-0.24	**1**	0.26	**1**	0.060	**0**	2	Excellent
3	Akwa I.	1.3	**0**	0.791	**0**	0.669	**0**	6	**0**	6	**0**	6	**0**	1.02	**0**	-0.14	**0**	-0.04	**0**	0.003	**3**	3	Excellent
4	Anambra	0.6	**0**	0.431	**0**	0.866	**0**	5	**0**	10	**2**	8	**0**	0.92	**0**	-0.06	**0**	-0.13	**0**	0.826	**0**	4	Excellent
5	Bauchi	1.3	**0**	0.807	**0**	0.556	**0**	2	**0**	5	**0**	4	**0**	1.02	**0**	-0.12	**0**	-0.03	**0**	0.762	**0**	0	Excellent
6	Bayelsa	1.1	**0**	0.370	**0**	0.054	**2**	5	**0**	8	**2**	9	**2**	0.99	**0**	0.06	**0**	0.24	**1**	0.871	**0**	7	Excellent
7	Benue	2.4	**0**	0.679	**0**	0.473	**0**	4	**0**	8	**2**	5	**0**	0.95	**0**	-0.08	**0**	-0.13	**0**	0.063	**0**	2	Excellent
8	Borno	1.0	**0**	0.315	**0**	0.496	**0**	3	**0**	5	**0**	3	**0**	1.05	**0**	0.08	**0**	-0.33	**1**	0.286	**0**	1	Excellent
9	Cross R.	1.2	**0**	0.309	**0**	0.143	**0**	4	**0**	9	**2**	9	**2**	1.01	**0**	0.02	**0**	0.25	**1**	0.000	**5**	10	Good
10	Delta	0.9	**0**	0.332	**0**	0.167	**0**	6	**0**	9	**2**	7	**0**	1.02	**0**	-0.05	**0**	-0.21	**1**	0.095	**0**	3	Excellent
11	Ebonyi	2.1	**0**	0.871	**0**	0.072	**2**	6	**0**	8	**2**	9	**2**	1.01	**0**	-0.13	**0**	0.01	**0**	0.437	**0**	6	Excellent
12	Edo	0.3	**0**	0.523	**0**	0.957	**0**	5	**0**	4	**0**	8	**2**	0.97	**0**	0.10	**0**	0.09	**0**	0.145	**0**	2	Excellent
13	Ekiti	1.0	**0**	0.072	**2**	0.974	**0**	7	**0**	8	**2**	6	**0**	1.02	**0**	0.05	**0**	0.16	**0**	0.424	**0**	4	Excellent
14	Enugu	1.5	**0**	0.611	**0**	0.232	**0**	5	**0**	5	**0**	8	**2**	1.07	**0**	-0.05	**0**	-0.28	**1**	0.021	**1**	4	Excellent
15	FCT	1.5	**0**	0.383	**0**	0.616	**0**	5	**0**	5	**0**	5	**0**	1.02	**0**	-0.34	**1**	0.19	**0**	0.000	**5**	6	Excellent
16	Gombe	2.8	**5**	0.155	**0**	0.545	**0**	3	**0**	5	**0**	3	**0**	1.05	**0**	-0.20	**1**	0.00	**0**	0.149	**0**	6	Excellent
17	Imo	0.7	**0**	0.717	**0**	0.030	**4**	6	**0**	7	**0**	6	**0**	1.00	**0**	-0.24	**1**	-0.13	**0**	0.516	**0**	5	Excellent
18	Jigawa	1.1	**0**	0.343	**0**	0.029	**4**	4	**0**	6	**0**	3	**0**	1.03	**0**	-0.05	**0**	-0.06	**0**	0.188	**0**	4	Excellent

Annex 1: continued

State		Flags (SMART)		Overall Sex Ratio (x^2)		Age Ratio (6-29: 30-59 Mo (x^2)		DPS - Wt		DPS - Ht		DPS - MUAC		SD WHZ		Skewness WHZ		Kurtosis WHZ		Poisson distribution SMART WHZ<-2 (x^2)		Overall Score	
	Name	%	Score	*p*	Score	*p*	Score	#	Score	#	Score	#	Score	SD	Score	#	Score	#	Score	*p*	Score	%	Quality
19	Kaduna	1.4	0	0.896	0	0.274	0	4	0	5	0	6	0	1.04	0	-0.21	1	-0.15	0	0.108	0	1	Excellent
20	Kano	0.9	0	0.606	0	0.716	0	4	0	6	0	4	0	1.01	0	-0.14	0	0.21	1	0.318	0	1	Excellent
21	Katsina	1.7	0	0.409	0	0.208	0	5	0	8	2	8	2	1.02	0	0.03	0	0.17	0	0.081	0	4	Excellent
22	Kebbi	2.2	0	0.347	0	0.515	0	6	0	9	2	6	0	1.00	0	-0.09	0	0.03	0	0.468	0	2	Excellent
23	Kogi	0.3	0	0.782	0	0.393	0	6	0	7	0	11	2	0.86	5	0.23	1	0.50	3	0.301	0	11	Good
24	Kwara	1.2	0	0.356	0	0.789	0	5	0	8	2	4	0	0.92	0	0.02	0	0.52	3	0.120	0	5	Excellent
25	Lagos	1.5	0	0.270	0	0.380	0	7	0	8	2	8	2	0.98	0	0.02	0	0.10	0	0.193	0	4	Excellent
26	Nasarawa	0.8	0	0.742	0	0.389	0	4	0	5	0	3	0	1.02	0	-0.21	1	-0.09	0	0.047	1	2	Excellent
27	Niger	0.9	0	0.461	0	0.123	0	5	0	6	0	4	0	0.96	0	-0.06	0	0.08	0	0.176	0	0	Excellent
28	Ogun	0.5	0	0.958	0	0.791	0	6	0	8	2	6	0	0.97	0	0.10	0	0.15	0	0.422	0	2	Excellent
29	Ondo	1.1	0	0.704	0	0.786	0	9	2	9	2	7	0	0.99	0	-0.32	1	-0.13	0	0.076	0	5	Excellent
30	Osun	0.4	0	1.000	0	0.627	0	6	0	4	0	5	0	0.95	0	-0.13	0	0.22	1	0.021	1	2	Excellent
31	Oyo	0.0	0	0.472	0	0.638	0	7	0	5	0	5	0	0.93	0	-0.08	0	0.03	0	0.168	0	0	Excellent
32	Plateau	1.9	0	0.750	0	0.407	0	6	0	5	0	7	0	1.02	0	-0.05	0	0.34	1	0.211	0	1	Excellent
33	Rivers	1.2	0	0.909	0	0.188	0	5	0	7	0	5	0	0.96	0	-0.09	0	0.04	0	0.002	3	3	Excellent
34	Sokoto	2.0	0	0.399	0	0.494	0	4	0	9	2	4	0	1.01	0	0.01	0	-0.03	0	0.169	0	2	Excellent
35	Taraba	0.7	0	0.859	0	0.952	0	5	0	7	0	5	0	1.08	0	-0.10	0	0.05	0	0.026	1	1	Excellent
36	Yobe	1.8	0	0.084	2	0.357	0	3	0	7	0	6	0	1.04	0	0.00	0	-0.03	0	0.429	0	2	Excellent
37	Zamfara	2.0	0	0.774	0	0.000	10	4	0	11	2	6	0	1.07	0	-0.12	0	-0.13	0	0.056	0	12	Good
National		1.5	0	0.405	0	0.448	0	1	0	5	0	2	0	1.02	0	-0.07	0	-0.01	0	0.000	5	5	Excellent

Annex 2: List of Indicators

S.N	Indicators	Numerator	Denominator
1. Child Nutrition			
1.1	**Underweight**		
1.1.1	Underweight prevalence	Number of children under age 5 who fall below minus two standard deviations from the median weight for age of the WHO standard	Total number of children age 0-59 months
1.1.2	Moderate underweight prevalence	Number of children under age 5 who fall between below minus two to greater than or equal to minus three standard deviations from the median weight for age of the WHO standard	Total number of children age 0-59 months
1.1.3	Severe underweight prevalence	Number of children under age 5 who fall below minus three standard deviations from the median weight for age of the WHO standard	Total number of children age 0-59 months
1.2	**Stunting**		
1.2.1	Stunting prevalence	Number of children under age 5 who fall below minus two standard deviations from the median height for age of the WHO standard	Total number of children age 0-59 months
1.2.2	Moderate Stunting prevalence	Number of children under age 5 who fall between below minus two to greater than or equal to minus three standard deviations from the median height for age of the WHO standard	Total number of children age 0-59 months
1.2.3	Severe Stunting prevalence	Number of children under age 5 who fall below minus three standard deviations from the median height for age of the WHO standard	Total number of children age 0-59 months
1.3	**Wasting (Z-Score)**		
1.3.1	Wasting prevalence	Number of children age 0-59 months who fall below minus two standard deviations from the median weight for height of the WHO standard	Total number of children age 0-59 months
1.3.2	Moderate Wasting prevalence	Number of children age 0-59 months who fall between below minus two to greater than or equal to minus three standard deviations from the median weight for height of the WHO standard	Total number of children age 0-59 months
1.3.3	Severe Wasting prevalence	Number of children age 0-59 months who fall below minus three standard deviations from the median weight for height of the WHO standard	Total number of children age 0-59 months
1.4	**Acute malnutrition (MUAC &/or bilateral edema)**		
1.4.1	Wasting prevalence	Number of children age 6-59 months who fall below MUAC 125 mm and/or bilateral edema	Total number of children age 6-59 months
1.4.2	Moderate Wasting prevalence	Number of children age 6-59 months fall between below MUAC 125 mm and greater or equal to 115 mm	Total number of children age 6-59 months
1.4.3	Severe Wasting prevalence	Number of children age 6-59 months who fall below MUAC 115 mm and/or bilateral edema	Total number of children age 6-59 months

S.N	Indicators	Numerator	Denominator
1.5	**Acute Malnutrition (WHZ &/ or bilateral edema)**		
1.5.1	Acute malnutrition prevalence	Number of children age 6-59 months who fall below minus two standard deviations from the median weight for height (WHZ) of the WHO standard and/or bilateral edema	Total number of children age 6-59 months
1.5.2	Moderate acute malnutrition prevalence	Number of children age 6-59 months who fall between below minus two to greater than or equal to minus three standard deviations from the median weight for height of the WHO standard	Total number of children age 6-59 months
1.5.3	Severe acute malnutrition prevalence	Number of children age 6-59 months who fall below minus three standard deviations from the median weight for height of the WHO standard and/or bilateral edema	Total number of children age 6-59 months
1.6	**Overweight**		
1.6.1	Overweight prevalence	Number of children under age 5 who are above two standard deviations of the median weight for height of the WHO standard	Total number of children age 0-59 months
2. Women Nutrition			
2.1	Acute Malnutrition prevalence	Number of women age 15 - 49 years who fall below MUAC 230 mm	Total number of women age 15 to 49
2.2	Moderate Acute Malnutrition prevalence	Number of women age 15 - 49 years who fall between below MUAC 230 mm and greater than or equal to 180 mm	Total number of women age 15 to 49
2.3	Severe Acute Malnutrition prevalence	Number of women age 15 - 49 years who fall below MUAC 180 mm	Total number of women age 15 to 49
3. Child Health			
3.1	Diphtheria, tetanus- pertussis (DTP) or DTP, Hepatitis b and Haemophilus influenza type b (Penta) immunization coverage	Number of children age 12-23 months who received the third dose of DTP/Penta vaccine (DTP3/Penta3) before the survey	Total number of children age 12 to 23 months
3.2	Measles immunization coverage	Number of children age 12 to 23 months who received measles vaccine before the survey	Total number of children age 12 to 23 months
3.3	Prevalence of diarrhea among children under age 5 years	Number of children under age 5 years who had diarrhea in the last two weeks	Total number of children under age 5 years
3.4	Diarrhoea treatment with oral rehydration salts (ORS) and zinc	Number of children under age 5 years with diarrhea in the previous 2 weeks who received ORS and Zinc	Total number of children under age 5 years with diarrhea in the previous 2 weeks
3.5	Antibiotic treatment for children with Acute Respiratory Infection (ARI) or suspected pneumonia	Number of children under age 5 years with ARI symptoms/ suspected pneumonia in the last 2 weeks who received antibiotics	Total number of children under age 5 years with ARI symptoms/ suspected pneumonia in the last 2 weeks
4. Malaria			
4.1	Household availability of mosquito nets	Number of households with; (a) at least one mosquito nets (b) at least one mosquito nets for every two people	Total number of households surveyed

S.N	Indicators	Numerator	Denominator
4.2	Children under age 5 who slept under a mosquito net	Number of children under age 5 years who slept under a mosquito net the previous night	Total number of children under age 5 who spent the previous night in the interviewed households
4.3	Anti-malarial treatment of children under age 5	Number of children under age 5 years with fever in the last 2 weeks who received any antimalarial treatment	Total number of children under age 5 years with fever in the last 2 weeks
4.4	Treatment with Artemisinin-based Combination Therapy (ACT) among children who received anti-malarial treatment	Number of children under age 5 years with fever in the last 2 weeks who received ACT (or other first-line treatment according to national policy)	Total number of children under age 5 years with fever in the last 2 weeks who received any anti-malarial drugs
4.5	Intermittent preventive treatment for malaria during pregnancy	Number of women age 15-49 years who received three or more doses of SP/Fansidar, at least one of which was received during an ANC visit, to prevent malaria during their last pregnancy that led to a live birth in the last 2 years	Total number of women age 15-49 years with a live birth in the last 2 years
5. Reproductive Health			
5.1	Skilled attendant at delivery	Number of women age 15-49 years with a live birth in the last 2 years who were attended by skilled health personnel during their most recent live birth	Total number of women age 15-49 years with a live birth in the last 2 years
5.2	Contraceptive prevalence rate	Number of women age 15-49 years currently married or in union who are using (or whose partner is using) a (modern or traditional) contraceptive method	Total number of women age 15-49 years who are currently married or in union
5.3	Antenatal care coverage	Number of women age 15-49 years with a live birth in the last 2 years who were attended during their last pregnancy that led to a live birth a. at least once by skilled health personnel b. at least four times by any provider	Total number of women age 15-49 years with a live birth in the last 2 years
6. HIV			
6.1	HIV testing during antenatal care	Number of women age 15-49 years who had a live birth in the last 2 years and received antenatal care during the pregnancy of their most recent birth, reporting that they were offered and accepted an HIV test during antenatal care and received their results	Total number of women age 15-49 years who had a live birth in the last 2 years
7. MNCHW			
7.1	MNCHW coverage	Number of households reached with MNCHW in the last six months	Total number of households
7.2	Vitamin A supplementation among children	Number of children age 6-59 months who received at least one high-dose vitamin A supplement in the 6 months preceding the survey	Total number of children age 6-59 months
7.3	Deworming among children	Number of children age 12-59 months who given an anthelmintic drug in the 6 months preceding the survey	Total number of children age 12-59 months

S.N	Indicators	Numerator	Denominator
8	**IYCF**		
	Children ever breastfed	Number of children 0-23 (born in the last 24) months who were ever breastfed	Total number of children aged 0-23 months
8.1	Early initiation of breastfeeding	Number of children 0-23 months who were put to the breast within the first hour of birth	Total number of children aged 0-23 months
	Bottle feeding	Number of children 0–23 months of age who were fed with a bottle during the previous day	Total number of children aged 0-23 months
8.2	Exclusive breastfeeding	Number of infants 0-5 months who received breast milk the previous day (in the past 24 hours) and did not receive any other foods or liquids during the previous day	Total number of infants aged 0-5 months
8.3	Continued breastfeeding (at 1 year)	Number of children 12–15 months of age who received breast milk during the previous day	Total number of children aged 12-15 months
8.4	Continued breastfeeding at 2 years	Number of children 20–23 months of age who received breast milk during the previous day	Total number of children aged 20-23 months
8.5	Introduction of solid, semi-solid or soft foods	Number of infants 6–8 months of age who breastfed and also received solid, semi-solid or soft foods during the previous day	Total number of children aged 6-8 months
8.6	Minimum Dietary Diversity	Number of children 6–23 months of age who received foods from ≥4 food groups[113] during the previous day	Total number of children aged 6-23 months
8.7	Minimum Meal Frequency	Number of breastfed and non-breastfed children 6–23 months of age who received solid, semi-solid or soft foods the minimum number of times[114] or more during the previous day	Total number of breastfed children aged 6-23 months
8.8	Minimum Acceptable Diet	Number of breastfed and non-breastfed children 6–23 months of age who had at least the minimum dietary diversity and the minimum meal frequency during the previous day	Total number of breastfed children aged 6-23 months
8.8	Consumption of iron-rich or iron-fortified foods	Number of children 6–23 months of age who received iron-rich food or an iron-fortified food during the previous day	Total number of breastfed children aged 6-23 months

[113]Dietary diversity is computed based on 7 food groups as recommended by WHO (2008b) which comprise of: grains, roots and tubers; legumes and nuts; dairy products; flesh foods (meat, fish, poultry and organ meats); eggs; vitamin-A rich fruits and vegetables other fruits and vegetables. Consumption of any amount of food from each food group is sufficient to count except if a food item was only used as a condiment.

[114]Minimum dietary diversity is defined as: 2 times for breastfed infants 6–8 months old; 3 times for breastfed children 9–23 months old and 4 times for non-breastfed children 6–23 months old (WHO, 2008a). "Meals" include both meals and snacks (other than trivial amounts) as reported by the respondents.

Annex 3: Survey implementation timeline

Activities	Jan-2018				Feb-2018				Mar-2018				Apr-2018				May-2018				Jun-2018			
	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4
Survey Planning																								
Steering committee planning meetings and engaging partners for support																								
Pre-survey household listing																								
Selecting indicators with partners																								
Review and presentation of draft survey protocol																								
Survey Requirements/Logistics planning and budgeting activities																								
Sampling and printing of EA maps																								
Survey Tools Development																								
Design and review of paper and electronic data collection tools																								
Programming of tablets																								
Pretest the application of tablets																								
Pretest the functionality of dashboard																								
Preparing training manual																								
Survey Teams Training																								
Recruiting survey personnel																								
Finalizing training document																								
Field test of tablets and dashboard																								
Provide training for enumerators																								
Field Work																								
Establishing field teams																								
Assigning supervisor and																								

coordinators																								
Conducting field data collection																								
Data Management																								
Development of data entry templates and analysis syntaxes																								
Data cleaning and analysis																								
Reporting																								
Draft preliminary summary report																								
Debrief/Sharing of preliminary summary report																								
Preparation and submission of final report																								
Publication & Dissemination																								

Annex 4: Survey Team Members

SNO	NAME	TEAM	ROLE	GROUP	SNO	NAME	TEAM	ROLE	GROUP
1	Aliyu Abubakar	SUP 1	SUP	N1	56	Patience Atabo	7	AM	N6
2	Iyabo Abdulganiyu	1	TL	N1	57	John Taye	8	M	N6
3	Kwagha Cecilia	1	M	N1	58	Otovwe Rose	8	AM	N6
4	Khadijat Abubakar	1	AM	N1	59	Rita Izuagie	8	TL	N6
5	Orimiyeye Ruth	2	AM	N1	60	Ekezie Nneamaka	SUP7	SUP	N6
6	Gladys S. Bulus	2	TL	N1	61	Kelvin Udoko	9	M	N6
7	Grace Marthia	2	M	N1	62	Adams Gladys	9	AM	N6
8	Oluwabunmi Awoyinka	3	AM	N1	63	Odu Gloria	10	TL	N6
9	Deborah Ambosun	3	TL	N1	64	Ethel Dienagha	10	AM	N6
10	Maryam Umar	3	AM (X)	N1	65	Vivian Ogedengbe	10	M	N6
11	Aisha,Aliyu	3	M	N1	66	Queen Ngozi Eli		SO	N6
12	Osakwua Ruth	SUP 2	SUP	N2	67	Nonye Anene		SUP	N7
13	Idika Favour	4	AM	N2	68	Olarewaju Jenifer	19	M	N7
14	Jessica M Karger	4	M	N2	69	Uche Serah	19	TL	N7
15	Altini Usman	4	TL	N2	70	Oligo Justin	19	AM	N7
16	Ikani Mabel	5	M	N2	71	Victory Chijindum	20	TL	N7
17	Olatunde Olapeju	5	TL	N2	72	Okume Benedeita	20	M	N7
18	Moji Ajibola Esther	5	AM	N2	73	Wealth	20	AM	N7
19	Lilian Peter	6	AM	N2	74	Ibebuike Chinenye	21	TL	N7
20	Zainab Umar	6	AM(x)	N2	75	Ifeoma Onyeagusi	21	M	N7
21	Elizabeth Ahmed	6	TL	N2	76	Ameh Theresa	21	AM	N7
22	Balikisu ibrahim Ahmed	6	M	N2	77	Ugo Maureen		SUP	N8
23	Talatu Jonathan	SUP 3	SUP	N3	78	Nnamba Serah	22	TL	N8
24	Mary Sanni		M	N3	79	Okafor Chinwe	22	M	N8
25	Olayemi Tobi	11	TL	N3	80	Fagbolagun Wole	22	AM	N8
26	Maryam Muhammed	13	AM	N3	81	Okekwe Rita	23	TL	N8
27	Aisha Dantanko		M	N3	82	Nwaichi Chijioke	23	M	N8
28	Binda Maureen		M	N3	83	Justina Olayemi	23	AM	N8
29	Obe Olugbenga	11	M	N3	84	Chinenye Obindu	24	TL	N8
30	Nalum Habu		AM	N3	85	Ani Felicia	24	AM	N8
31	Bukola G Tella		M	N3	86	Kanu Chidinma	24	M	N8
32	Barakat Adebisi A.		M	N3	87	Onawele M.O	SUP 9	SUP	N9
33	Abubakar Amina A.		M	N3	88	Idowu Oluyinka	25	TL	N9
34	Kemi Aderidigbe		M	N3	89	Olowookere Ola J.	25	M	N9
35	Mbani Julianah	SUP 4	SUP	N4	90	Oladele T. Esther	25	AM	N9
36	Theresa Danjuma		M	N4	91	Tekiyat A.	26	TL	N9
37	Joy Ada John		M	N4	92	Filani Opeyemi	26	M	N9
38	Patience Agu		M	N4	93	Salami Saheed	26	AM	N9
39	Adeboye Caroline		AM	N4	94	Eesuola Ifeoluwa	27	TL	N9
40	Bitiyong Patricia		AM	N4	95	Adaramaja Modupe	27	M	N9
41	Kehinde Osatogbe		M	N4	96	Adeniran Afeez Niyi	27	AM	N9
42	Esther Pwajok Bot	13	TL	N4	97	Odetunde Kayode	SUP 10	SUP	N10
43	Helen Aaron		AM	N4	98	Solademi Opeyemi	28	TL	N10
44	Abigail Timothy	12	TL	N4	99	Olasupo Taiwo	28	M	N10
45	Rahab Sunday		M	N4	100	Adeniran Bukola	28	AM	N10
46	Ladi Wampana	SUP 5	SUP	N5	101	Dada Muibat	29	TL	N10
47	Hassana Haruna	17	M	N5	102	Ajibade Abdulrashid	29	M	N10
48	Janada Bulus	18	AM	N5	103	Owolewa Nike	29	AM	N10
49	Ladi Michael	18	TL	N5	104	Ajiboye Taye	30	TL	N10
50	Makai Joshua	18	M	N5	105	Awoyele D. Ifedapo	30	M	N10
51	Aisha Usman	17	M	N5	106	Adewale Solanke	30	AM	N10
52	Margaret Benson	17	M	N5	107	Obiekwe Chinenye	22	SO	N8

SNO	NAME	TEAM	ROLE	GROUP	SNO	NAME	TEAM	ROLE	GROUP
53	Okoronwko Oluchi	SUP6	SUP	N6	108	Okunola Olatunji	28	SO	N10
54	Oga Stella	7	M	N6	109	Oyediran S. Oyeronke	30	SO	N10
55	Ozioma Ejimaonu	7	TL	N6					
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	Dr Isiaka Olarewaju	Project Director				Odetunde Kayode	Regional Coordinator		
	Adeniran Adeyemi	National Coordinator				Olasukanmi Lateef	Regional Coordinator		
						Abiola Arosanyin	Regional Coordinator		
	Okara Dogara	Training Coordinator				Umuna Christine	Regional Coordinator		
	Chima Elenwune	Training Coordinator				Solademi Abigail	Regional Coordinator		
	Odiakpa Lovett	Survey Coordinator				Ofonakara Oby	Regional Coordinator		
	Bakare Saheed	Survey Coordinator							
	Olarewaju Abolaji	Survey Coordinator							
	Olarewaju Elizabeth	Survey Coordinator							

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