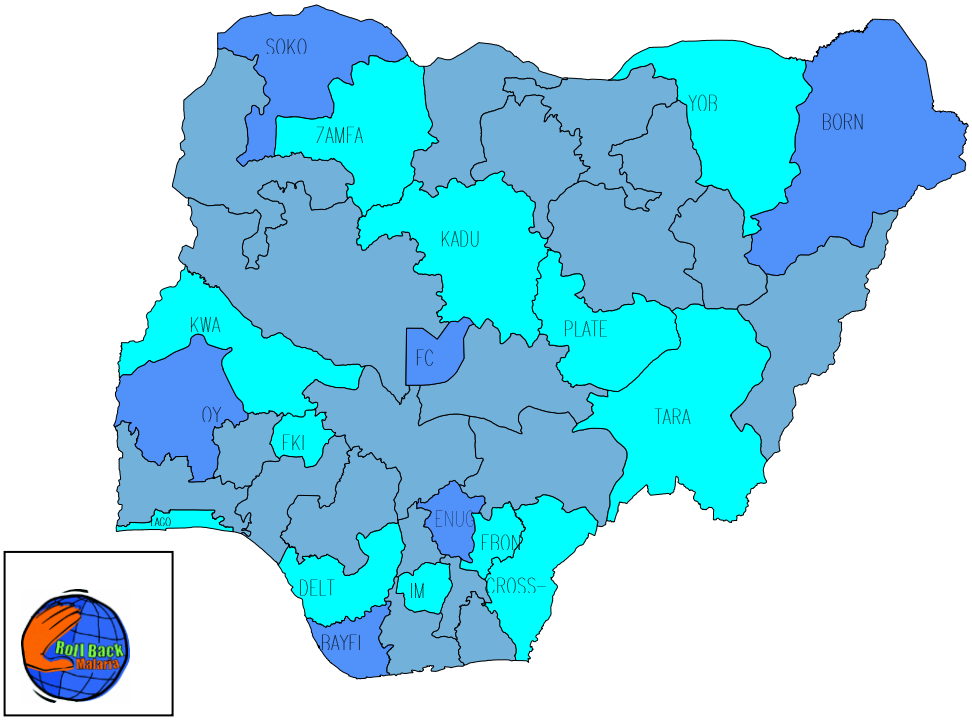
Mid-Term Evaluation of Phase One and Baseline Survey for Phase 2 Global Fund Round 4 Grant for Scaling Up Malaria Control in Nigeria



TECHNICAL REPORT

JANUARY 2008

Society for Family Health | Federal Ministry of Health Abuja | Yakubu Gowon Centre

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Acknowledgements

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We also wish to recognise the support and contribution of all State Ministries of Health and their Malaria Control Units during the field work.

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Acronyms

ACT	Artemisinin-Based Combination Therapy
ANC	Antenatal Care
BCC	Behaviour Change Communication
CBO	Community Based Organisation
FCT	Federal Capital Territory
FMOH	Federal Ministry of Health
GFATM	Global Fund to fight AIDS, Tuberculosis, and Malaria
IEC	Information, Education & Communication
IPT	Intermittent Preventive Treatment
ITN	Insecticide Treated Net
LGA	Local Government Area
LLIN	Long Lasting Insecticidal Net
MCP	Malaria Control Programme
MDG	Millennium Development Goals
M&E	Monitoring and Evaluation
NEEDS	National Economic Empowerment and Development Strategy
NDHS	Nigeria Demographic and Health Survey
NGO	Non Governmental Organisation
NMCP	National Malaria Control Programme
NPC	National Planning Commission
PHC	Primary Health Care
PMV	Patent Medicine Vendor
PPD	Pre-Packaged Drugs
PPT	Pre-packaged treatment
PR	Principal Recipient
PSI	Population Services International
RBM	Roll Back Malaria
SEEDS	State Economic Empowerment Development Strategy
SFH	Society for Family Health
SP	Sulphadoxine-Pyrimethamine
SR	Sub-Recipient
YGC	Yakubu Gowon Centre

Executive Summary

Background

Nigeria received two Global Fund Malaria Grants (Rounds 2 & 4) to implement malaria prevention programmes in eighteen of the thirty – six states, including the Federal Capital Territory. The Yakubu Gowon Centre was the principal recipient. The Round 2 grant was called "Scaling up Roll Back Malaria in twelve states (Cross River, Delta, Ebonyi, Ekiti, Imo, Kaduna, Kwara, Lagos, Plateau, Taraba, Yobe, and Zamfara)". The Round 4 grant was called "Improving Malaria Case Management through Promotion and Distribution of Pre-Packaged Artemisinin-Based Combination Therapy (ACT) and Training of Health Service Providers"; the Round 4 grant covered Borno, Bayelsa, Sokoto, FCT, Enugu and Oyo states.

Objective and Rationale

At the end of the first phase of the two grants, the Nigerian Country Coordinating Mechanism (CCM) applied and received approval for a reprogrammed and modified Phase 2 Round 4 grant. This grant included the merger of the rounds 2 and 4 grant objectives, private/public sector mix, and engagement of the Society for Family Health as a second principal recipient to handle interventions through the private sector. This survey was conducted to serve as a mid-term evaluation of Phase 1 of the Rounds 2 and 4 Global Fund Malaria grants, and to provide baseline data for monitoring and evaluation of several novel aspects of the now reprogrammed Phase 2 Round 4 Global Fund grant. The survey was meant to achieve the following objectives: (i) assess and measure achievements recorded against set objectives; (ii) establish baseline figures for Phase 2 outcome indicators; and; (iii) assess the effectiveness and efficiency of the project. The survey results directly addressed the first two objectives, and contributed some information relevant for the achievement of the third objective.

Methodology

This was a cross-sectional and population-based survey. A systematic, multi-stage sampling technique was used to select pregnant women and caregivers of under-five children resident in the eighteen Global Fund states and three other adjoining states. Data were collected by trained interviewers using validated questionnaires to obtain information on maternal and child health with focus on malaria control. Data from a total of 2,348 pregnant women and 7,223 caregivers of children under-five years of age who were interviewed were collated and analysed. Data management and analysis were performed with the Statistical Package for Social Sciences (SPSS version 11.5).

Key Findings

The proportion of households that owned at least one insecticide treated net (ITN/LLIN) was 23.3%. The proportion of children under-five years of age and pregnant women who slept under ITNs/ LLINs the previous night were 15.4% and 13.5% respectively. The proportion of women that gave birth in the last two years who received intermittent preventive treatment (IPT) for malaria was 58.9%. While these coverage rates were a significant improvement over the results of a major 2005 national survey, they still fell short of the current national strategic target of 80%.

Analysis based on a relatively small sample size[1] showed that 43.9% of under-five children with malaria were treated with an ACT within 24 hours of onset. A larger sample size will be needed to ascertain whether this result truly represents the situation.

The majority of caregivers could recognise symptoms of uncomplicated malaria but the survey showed a very low community awareness of ACTs with less than 10% of the caregivers able to express knowledge of ACTs. Caregivers' ability to recognise signs of

[1] Only those that have heard of ACT

severe malaria was also poor. Knowledge of insecticide treated nets (ITNs/LLINs) was high but majority of the caregivers stated that ITNs/LLINs were not available in the neighbourhood/local shops, suggesting low private sector participation in ITN/LLIN distribution in these communities. A summary of the core Global Fund Round 4 indicators assessed in this survey is presented in Table 1 as part of this Executive Summary.

Programme Implications and Recommendations

The survey shows a modest progress towards achieving the Global Fund Round 4 project targets but ITN/LLIN and IPT coverage rates remain generally low, and far from the national strategic targets. Low level of awareness about ACTs calls for a re-appraisal and scale-up of social mobilisation and behavioural change communication efforts. It is expected that increased private sector participation in this phase of the Global Fund grant programme implementation will increase private sector participation in the distribution of malaria control commodities, and boost access to and utilisation of preventive and treatment services. The survey has also highlighted variations in the rate of coverage for both treatment and prevention services across states, geo-political zones and urban and rural areas. There is a need to carefully review programme strategies with a view to achieving equitable programme delivery, improving quality and coverage of services, and closing observed coverage gaps.

Table 1: Summary of Core Programme indicators for Global Fund Round 4 Malaria Grant to Nigeria evaluated in the survey

S/No	**Core Global Fund Output Indicators Captured in the Survey***	**Current survey results 2008**		National Malaria indicator survey October 2005	GF Grant project Target
		GF States	**National average**	**National average**	
1	Proportion of Pregnant women who slept under ITNs/ LLINs the previous night	13.5%	13.5%	7%	19%
2	Proportion of Children under 5 years who slept under ITNs/ LLINs the previous night	15.3%	15.4%	6%	16%
3	Proportion of children under-five who received appropriate treatment with ACT within 24 hours of onset of illness*	48.3%?	43.9	Approx 20% (most cases were treated with Chloroquine)	32%
4	Proportion of caregivers who recognise the symptoms of uncomplicated malaria and can mention at least one preventive measure against malaria	57.3%	59.9%	-	50%
5	Proportion of caregivers who recognise the signs of severe and complicated malaria (convulsion)	16.0%	15.6%	-	-
6	% of women that gave birth in the last two years who received Intermittent preventive treatment (IPT)	57.0%	58.9%	10%	-
7	% of currently pregnant women on Intermittent preventive treatment (IPT)	20.8%	22.5%	10%	

*Please note that indicator #3 has been derived from a relatively small sample in this 2008 survey

1. 0 Introduction

1.1 Demographic and Health Status

Nigeria, the most populous country in Africa, has a population of over 140 million. The country occupies a land area of 923,768 square kilometres and is richly endowed with natural resources including petroleum, solid minerals and a huge variety of agricultural produce. The country has two main seasons: a rainy season which begins in March/April and lasts till October/November, and a shorter dry season that lasts from late November to early March (There are variations in the different eco- zones in Nigeria). The average annual rainfall ranges from 1500mm to 3000mm; the rains are heavier in the coastal areas in the south. The vegetations vary from mangrove and tropical rainforest in the far south through Guinea and Sudan savannah to the Sahel in the far north.

The country has a federal system of government with a three-tier administrative structure at federal, state and local levels. There are 36 states, 774 Local Government Areas (LGAs) and a Federal Capital Territory (FCT). The culture is rich and diverse with over 200 ethnic/language groups. The dominant religions are Christianity and Islam. The country runs a three tier health system administered by the three tiers of government. The constitution of the country places health on the concurrent list which means that all tiers of government can make and implement policies with the exception of international health which is the exclusive preserve of the Federal Government. The malaria control policy and programme is under the Federal Ministry of Health which is responsible for policy development and dissemination while state and local governments are responsible for implementation, monitoring and reporting.

Nigeria still has some of the poorest demographic and health indices among African countries, with infant mortality of about 100 per 1000 live births, and under-five

mortality of 201 per 1000 live births[2]. Knowing how much malaria contributes to these social and economic woes, the Nigerian government considers malaria control a key national health care priority and has linked it with several development initiatives such as the Millennium Development Goals (MDG) and the national economic empowerment and development strategy (NEEDS).

1.2 Burden of Malaria in Nigeria: Trend and Current Status

Malaria is a major public health problem in Nigeria, accounting for about 60% of outpatient attendance and 30% of hospital admissions. Malaria transmission is high all year round with estimated incidence rates of 2.5, 1.5, 1.0 and 0.5 malaria fever attacks per person per year in the age groups 0 to 2 years, 2 to 5 years, 5 to 10 years and above 10 years respectively (FMOH 2004)[3]. It is estimated that there are nearly 110 million clinical cases of malaria and 300,000 deaths per year mostly in young children. Malaria is known to account for about 25% of infant deaths, 30% of under-five child deaths and 11% of maternal deaths. Most deaths due to malaria occur at home, and are therefore not reported, however malaria programme coverage has increased substantially across the country from 1991 to date.

Malaria contributes significantly to underdevelopment and poverty in Nigeria. It is responsible for high rates of absenteeism from school, work and market and puts heavy treatment cost on households and the health system. A fairly recent study jointly supported by the Federal Ministry of Health and WHO (Nigeria Office) has put the burden of malaria illness in Nigeria at about 17 percent GDP and has shown that reducing

[2] Nigeria Demographic and Health Surveys 2003

[3] Federal Ministry of Health. 2004 Annual Report of Malaria Control Programme in Nigeria. FMOH, Abuja

the incidence of malaria by 50% would grow productivity by about 2%.[4] The economic cost of malaria is widely quoted to be approximately ₦132 billion annually, including treatment costs, prevention, loss of man hours and productivity.

Following the Abuja summit, the Nigerian government developed a strategic plan to pursue a malaria control programme that would enable her achieve the targets set by the Abuja RBM Summit in the short term, and the global RBM objectives ultimately. The objective of the Nigerian Strategic Plan for Rolling Back Malaria (2001-2005) was to reduce mortality and morbidity due to malaria by 25% by 2005. The strategic plan adopted the target of the Abuja Declaration, which was to achieve at least 60% coverage of key indicators of access to effective treatment and preventive measures for the most vulnerable groups, children under-five years of age and pregnant women.

A desk review of the implementation of the 2001-2005 strategic plan and a nationwide sample survey of malaria indicators generally revealed low coverage levels for both treatment and preventive interventions, and fell far short of the 60% target set at the Abuja malaria summit and the national strategic document for malaria control 2001-2005. Results of the national survey conducted in October 2007 showed that while about 20% of households owned at least one bed net, the proportion of pregnant women and under-five children that slept under ITNs the previous night was 7% and 6% respectively.[5] The subsequent national strategic plan for malaria control (2006-2010) was therefore aimed at scaling up interventions that could help the nation not only catch up with the lag created in the 2001-2005 intervention period but to attain a higher target of 80 per cent coverage by 2010.

[4] WHO-Nigeria. The Economic Burden of Malaria: Evidence from Nigeria. World Health Organisation, Abuja Nigeria 2004.
[5] National Malaria Control Programme 2005 Annual Report, Abuja: Federal Ministry of Health.

The National Malaria Control Programme, which comprises of malaria control activities at federal, state, local government and community levels is built on the principle of the global malaria control strategy and the Roll Back Malaria programme, and is driven by strong multi-sectoral partnership including development partners, leading non-governmental organisations and the organised private sector. Control activities by partners, institutions and private / commercial establishments are also being implemented at various levels in the country, and derive from the plans and strategies developed by the national programme. The Global Fund supported malaria grant is one of such malaria control projects being implemented in Nigeria.

2.0: Objectives and Rationale for the Survey

2.1 The GFATM Malaria Grant

Nigeria received two Global Fund Malaria Grants (Rounds 2 & 4) to implement malaria prevention programmes in eighteen of the thirty - six states, including the Federal Capital Territory. The Yakubu Gowon Centre was the principal recipient of the two grants, while the National Malaria Control Programme, Federal Ministry of Health is the sub-recipient. The Round 2 grant was called "Scaling up Roll Back Malaria in 12 states (Cross River, Delta, Ebonyi, Ekiti, Imo, Kaduna, Kwara, Lagos, Plateau, Taraba, Yobe, and Zamfara)" and implementation started on November, 2004. It addressed the following interventions: nets distribution, improvement in case management and prevention of malaria in pregnancy. On the other hand, the Round 4 grant, which covered Borno, Bayelsa, Sokoto, FCT, Enugu and Oyo states, was called "Improving malaria case management through promotion and distribution of pre-packaged Artemisinin-Based Combination Therapy (ACT) and training of health service providers". Its implementation start date was January 2005.

The first phase of the two grants had successfully been implemented as at December 2006 and CCM Nigeria requested for continued funding of both grants. Following an iterative process between GF and CCM Nigeria, a largely reprogrammed and modified Round 4 grant was approved to move into the second phase. This second phase took into consideration lessons learnt from the first phase to plan more effectively for implementation and optimal achievement of targets. Some of the attributes of the reprogrammed grant include the merging of the Rounds 2 and 4 grant objectives, the introduction of private/public sector mix, engagement of the Society for Family Health as second principal recipient to handle interventions through the private sector and an additional SR to support the downstream component of the Procurement and Supply

Chain Management system in the public sector. The goal of the programme is to reduce malaria morbidity and mortality in children under-five years of age and pregnant women.

Main objectives of the Reprogrammed Global Fund Round 4 Phase 2 Malaria Grant

1. To improve the treatment of malaria in children under-five years using ACTs;
2. To provide Intermittent Preventive Treatment to pregnant women, using Sulphadoxine -Pyrimethamine (SP);
3. To strengthen the monitoring and evaluation system and reinforce the overall management of Roll Back Malaria.
4. To increase informed demand for ACT, SP and LLINs through information, education, communication/behaviour change and advocacy activities targeted at households, communities and caregivers in the eighteen Global Fund supported states.

The main activities of the grant include:

1. The procurement and distribution of anti-malaria medicines (ACTs and SPs) and health commodities (LLINs).
2. Training of health care providers, role model mothers and NGOs in malaria control and M & E at the national, state and local government levels.
3. Conducting of BCC and advocacy activities across the eighteen states;

At the end of the first phase of the implementation (December 2007) about 11,856,170 treatment courses of ACTs; 1,029,004 doses of SPs and 1,743,578 long lasting insecticide treated nets (LLINs) had been procured and distributed to service delivery points and end users across the eighteen states.

The grant is for five-years. It has a midterm assessment component where the grant recipient, through the PRs and SRs, is expected to conduct a survey to assess the level of achievement of expected project outcomes against its set objectives.

2.2 Survey Objectives

In view of the above, this survey was carried out to achieve the following objectives:

1. Measure achievements against set objectives;
2. Establish baseline figures for Phase 2 outcome indicators;
3. Assess the effectiveness of the project;

2.3 Target Groups

The target groups for this survey were caregivers of children under-five year of age and pregnant women. The selection of these target groups was informed by the fact that under-five children and pregnant women are the two most vulnerable groups to the deleterious effects of malaria. The strategic plan of the National Malaria Control Programme (NMCP) recognises the vulnerability of these two sub-groups, and has set targets to ensure that they have adequate access to available services and resources for malaria control in the country.

The harmonised Phase 2 Round 4 Global Fund grant for malaria control in Nigeria has also accorded priority to these target groups and set targets to monitor their access to effective treatment and preventive interventions capable of reducing malaria-related morbidity and mortality during the project period and beyond. The aim of this midterm/baseline assessment was to determine the progress of the control programme in meeting the targets within the states supported by the Global Fund Grant, and three adjoining states.

2.4 Survey States

A total of twenty - one states (including the Federal Capital Territory) were included in the survey. Three states were selected from each of the three geo-political zones in the south while four states were selected from each of the three zones in the north. The complete list of the states and local government areas involved in this survey is presented in Annex C of this report:

Box 1: List of States involved in the Survey

Zones	Survey States
South West	Lagos, Ekiti, Oyo
South East	Imo, Ebonyi, Enugu
South South	Delta, Cross River, Bayelsa
North East	Yobe, Taraba, Borno, Bauchi
North Central	Kwara, Plateau, FCT, Nassarawa
North West	Kaduna, Zamfara, Sokoto, Kano

3.0 Survey Methodology

3.1 Survey Design

The study was a population-based cross-sectional survey. To achieve the aim of the survey at an optimal cost, a probability sampling design was used. A multi-stage cluster sampling design was used to select samples of the two categories of study participants namely caregivers of children under-five years of age and pregnant women. The selection process was therefore aimed at achieving a fairly representative sample of study participants spread across each state in such a way as to reflect the social, economic, and geographic nature of the state.

3.2 Sampling Procedure and Sample Size

Given that the objective of the survey was to measure the malaria-related maternal and child care indicators in the states where the survey was conducted, the analysis was designed to run at state level thereby making the state the reporting domain and the basis for calculation of the sample size. Sample size was therefore calculated with a view to making the size of data from each state adequate for state-level interpretation of results.

Since the proportion of children under-five years of age and pregnant women that sleep under mosquito nets for each of the states was among the indicators to be measured these were used as benchmarks for sample size calculation. Based on the findings of the Nigeria Demographic and Health Survey (2004), 1.3 percent of pregnant women were found to have slept under Insecticide Treated Nets (ITNs) the previous night before the survey. This figure (1.3%) was therefore used as a statistical benchmark for calculating the sample size. An assumption was made that programme intervention would improve ITN coverage and increase the benchmark by 10% (that is from 1.3 to 11.3). The optimum minimum sample size required to detect 10% change was calculated using the following formula:

$$n = D\frac{\left[\sqrt{2P(1-P)}Z_{1-\alpha} + \sqrt{P_1(1-P_1)+P_2(1-P_2)}Z_{1-\beta}\right]^2}{\Delta^2}$$

Where:

D = design effect;
P_1 = the estimated proportion at the time of the first survey;
P_2 = the proportion at some future date such that the quantity (P_2 - P_1) is the size of the magnitude of change it is desired to be able to detect;
P = (P_1 + P_2) / 2;
$Z_{1-\alpha}$ = the Z-score corresponding to the probability with which it is desired to be able to conclude that an observed change of size (P_2 - P_1) would not have occurred by chance; and
$Z_{1-\beta}$ = the Z-score corresponding to the degree of confidence with which it is desired to be certain of detecting a change of size (P_2 - P_1) if one actually occurred.
α = 0.05 ($Z_{1-\alpha}$ = 1.96)
β = 0.20 ($Z_{1-\beta}$ = 0.84)

If P_1 = 0.013 and P_2 = 0.113, then from the formula the required sample size would be 108 pregnant women. Allowing for 10% non-response rate, the sample size was adjusted to 120 pregnant women for each of the states included in the survey.

In selecting a benchmark for calculating the optimum number of households with children under-five years to be surveyed, the value of current P_1 was assumed to be 0.5 since it was not feasible to identify a reliable local data for the relevant indicator. An expected change of 12% over the intervention period was also assumed (i.e. P_2 = 0.62). The required sample size based on these assumptions was calculated to be 312 per state. After adjusting for a non-response rate of 10%, a final sample size of 346 households each of which has at least one child under-five years of age was fixed per state. A minimum sample size of 108 pregnant women and 346 households with at least one child under-five years was targeted per state. A total of twenty clusters per state were estimated

to yield at least one hundred and twenty pregnant women and three hundred and sixty households each with at least one child under-five years of age. It was estimated that one cluster would contain an average of six pregnant women and eighteen households with at least one child under-five years of age.

3.3 Data Collection

Data was collected from caregivers of children under-five and pregnant women. Trained interviewers visited each of the selected localities. The quota allocated to each locality was identified through systematic random sampling and all pregnant women and caregivers selected for the survey were interviewed in their homes.

3.4 Data Collection Tool

A questionnaire was administered to collect data. The instrument consisted of questions on socio-demographic variables and determinants of behaviour. Two different interview schedules were used to obtain data from pregnant women and caregivers of children under-five years of age respectively. These semi-structured questionnaires were validated and pilot tested before use. The questionnaires were used to elicit information on key programme indicators and the various issues regarding prevention and treatment of malaria in the target groups. The interview schedules used in the survey are attached as annex to this report.

3.5 Training and Data Collection Activities

Interviewers were trained on the administration of the questionnaires as well as on all aspects of the interview process. The questionnaires were pre-tested on a small group of respondents to check for their understanding of the questions. The questionnaires were then pilot-tested in Abuja to determine the reliability of the items. Using a Likert response format, the scaled items were then revised based on the findings of the pre test

and the pilot test. During data collection a quality control process was implemented to identify and correct problems (e.g. skip patterns not followed, missing data etc). Interviewers were trained on the questionnaire by the research department and the field work was handled by trained research consultants with close oversight from the SFH and YGC research team.

3.6 Survey Indicators

The indicators evaluated in the survey were meant to address Global Fund indicators and other (process, output and outcome) indicators that relate to various aspects of malaria control and the national strategic plan. The following is the list of indicators evaluated in the survey.

Box 2: LIST OF INDICATORS EVALUATED IN THE SURVEY

1. % of caregivers who correctly cite symptoms of uncomplicated (fever) malaria in children of all caregivers with children under 5 years interviewed whether they have heard of malaria or not.
2. % of caregiver who correctly cite symptoms of severe (convulsion) malaria in children of all caregivers with children under 5 years interviewed whether they have heard of severe malaria or not.
3. % of Under 5 (U5) children with malaria/fever receiving appropriate treatment within 24 hours according to national guideline.
4. % of children U5 that slept under an ITN the previous night.
5. % of households with at least one ITN.
6. Proportion of caregivers who can mention at least one preventive measure against malaria.
7. % of pregnant women that slept under an ITN the previous night.
8. % of pregnant women who receive Intermittent Preventive Therapy(IPT) as prophylaxis for malaria
9. % of caregivers who know that they must seek treatment from an appropriate health facility for convulsions immediately after the symptoms appear of all caregivers with children under 5 years interviewed.
10. % of caregivers that have heard of mosquito nets.

11. % of caregivers that know where to get/obtain these bed nets treated with insecticides.
12. % of children under-five who received a full course of appropriate anti-malarial treatment (defined as Artemisinin-based combination therapy – ACTs) within 24 hours of all children surveyed who had fever in the last 2 weeks.

13. Percentage of caregivers who state that they know where to obtain ACTs PPT.

3.7 Data Analysis

Data was managed and analysed with Statistical Package for Social Sciences (SPSS version 11.5) using a pre-determined analysis plan. Frequency tables and cross tabulations were used to generate data tables and figures to present results in keeping with survey objectives and analysis plan. Further analysis was undertaken to explore determinants of level of knowledge and care-seeking practices of caregivers and pregnant women including use of LLIN.

4.0 Survey Results

4.1 General Characteristics of Respondents

Characteristics of the Pregnant Women

A total of 2,348 pregnant women were interviewed in twenty - one states and the Federal Capital Territory (FCT). Table 2 shows socio-demographic characteristics of the pregnant women and the antenatal clinic (ANC) attendance rate. Figure 1 shows the percentage distribution of gestational ages (age of pregnancy) of the interviewed women.

Table 2: Proportion of pregnant women registered for antenatal care

Characteristics of pregnant women studied	Number interviewed	% registered for antenatal care
Age (in years)		
15-24	836	50.6
25 and above	1512	54.6
All age-groups	2348	53.2
Ever Attended School		
No	453	39.5
Yes	1895	56.4
Highest educational level		
Quranic Only	322	41.0
Primary	536	55.8
Secondary	835	60.5
Higher	202	65.8
Age of pregnancy		
First trimester	472	16.7
Second trimester	968	52.0
Third trimester	851	76.9
Residence		
Urban	1064	58.1
Rural	1284	49.1

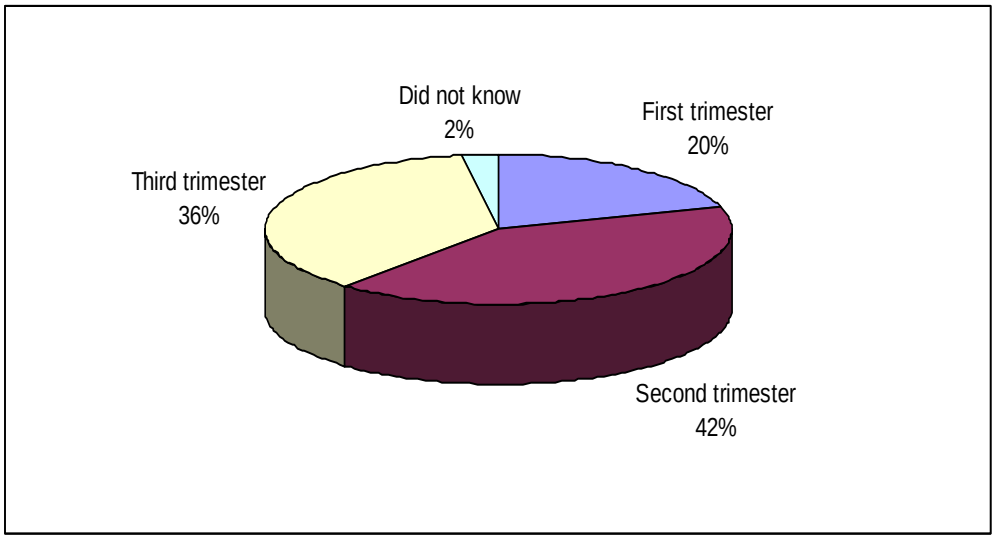

Figure 1: Gestational age of the interviewed pregnant women

The overall rate of antenatal attendance among the pregnant women interviewed was 53.2%. Antenatal attendance was lower among women who had never attended school compared to their educated counterparts (39.5% & 56.4% respectively). Antenatal attendance tended to increase with gestational age with about half of the women registered by the second trimester when they should be due for the first dose of intermittent preventive treatment (IPT) with sulphadoxine-pyrimethamine (SP).

Characteristics of Caregivers of Under-Five Children

Seven thousand two hundred and twenty-three (7,223) caregivers of under-five children were interviewed. The majority of the caregivers (81.0%) were female. Table 3 shows the highest level of education attained by the caregivers. Approximately a fifth (21.2%) of the caregivers had never attended school.

Table 3: Highest level of education attained by caregivers

States	Highest level of education attained				
	Quranic Only	Primary	Secondary	Higher	Total studied
Lagos	0.9	26.4	55.6	17.1	322
Oyo	1.8	30.4	53.5	14.3	273
Ekiti	0.6	21.9	64.7	12.8	329
Imo	0.0	13.7	71.6	14.7	211
Enugu	0.0	33.5	49.7	16.8	334
Ebonyi	0.9	48.9	41.3	8.9	235
Delta	0.3	24.6	64.0	11.1	325
Bayelsa	0.6	22.4	59.0	17.9	312
Cross Rivers	0.0	39.1	52.7	8.2	330
Yobe	36.8	21.8	20.9	20.5	220
Borno	37.0	28.1	26.0	8.9	281
Taraba	21.1	32.7	30.0	16.1	223
Kaduna	39.7	22.2	28.6	9.4	234
Sokoto	60.0	17.8	18.3	3.9	180
Zamfara	72.2	11.7	10.2	6.0	266
Kwara	5.1	30.8	41.3	22.8	276
Plateau	7.2	31.9	50.9	10.0	279
FCT	5.4	31.5	45.3	17.8	298
Bauchi	34.2	35.9	20.1	9.8	234
Nassarawa	15.8	30.1	37.5	16.6	259
Kano	52.5	19.9	19.5	8.2	282
National	**16.8**	**27.6**	**42.5**	**13.1**	**5703**

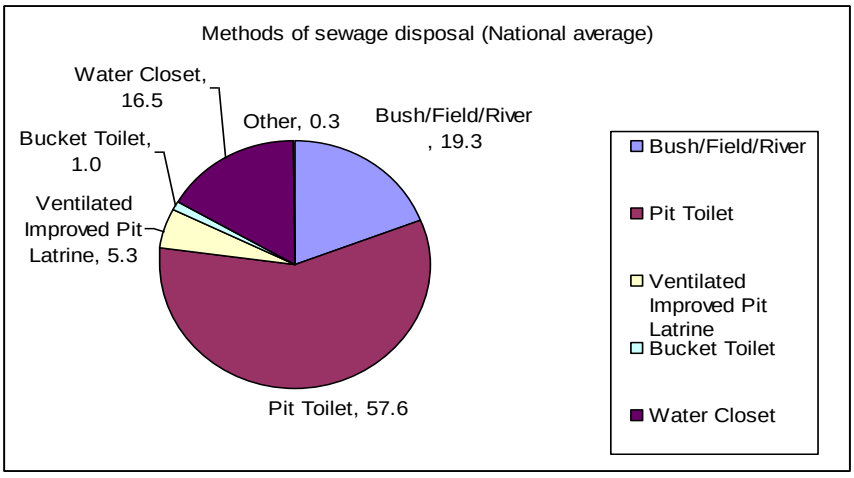

Figure 2: Percentage distribution of methods of sewage disposal

Figure 2 shows the sewage disposal methods used in the households of care givers interviewed in the survey. Sewage disposal was predominantly by either pit toilet or open disposal method. This is indicative of the poor socio-economic situation of these households.

Tables 4 and 5 show the distribution of the respondents' socio-economic status[6] according to the geopolitical zones and states, respectively. In general, respondents were evenly distributed across the four socio-economic classes. However substantial spatial variations exist in some states. For instance, a predominant proportion of the respondents in the FCT were in the upper socio-economic class.

Table 6 shows sources of water for domestic use. Half of the households used water from either a well or stream. The sources of water supply and methods of sewage disposal were generally sub-optimal. Inappropriate storage of water for domestic and other uses could influence the breeding of malaria-carrying mosquitoes.

Table 4: Percentage distribution of the respondents' socio-economic class according to geopolitical zones

Geopolitical Zones	**Socio-economic class**			
	SES-D	**SES-C**	**SES-B**	**SES-A**
North West	22.6	27.8	23.4	26.2
North East	27.8	23.5	19.8	28.9
North Central	21.1	22.4	23.9	32.6
South West	23.5	27.3	24.9	24.3
South East	19.9	18.8	25.4	35.9
South South	30.3	19.5	25.2	25.0
National	**24.3**	**23.5**	**23.5**	**28.8**

[6] Socio-economic status is derived according to ownership of durables with SES-A being the highest and SES-D the lowest

Table 5: Percentage distribution of the respondents' socio-economic class by states

States	**Socio-economic class**			
	SES-D	**SES-C**	**SES-B**	**SES-A**
Lagos	14.5	28.0	26.9	30.6
Oyo	20.7	33.3	24.1	21.8
Ekiti	35.3	20.1	24.0	20.7
Imo	14.1	13.2	20.7	52.0
Enugu	17.2	16.9	29.4	36.6
Ebonyi	26.3	24.4	24.4	24.9
Delta	11.6	19.4	35.4	33.6
Bayelsa	34.9	24.0	20.1	20.9
Cross River	43.4	15.1	20.4	20.7
Yobe	25.1	29.1	16.8	29.1
Borno	34.2	24.7	21.9	19.2
Taraba	31.5	19.8	16.2	32.6
Kaduna	24.9	26.6	24.9	23.7
Sokoto	20.9	20.5	22.0	36.6
Zamfara	32.6	26.7	19.2	21.4
Kwara	17.2	21.3	29.6	31.9
Plateau	29.6	30.2	19.3	20.9
FCT	10.4	15.9	24.3	49.3
Bauchi	20.7	20.7	23.9	34.6
Nassarawa	27.5	21.8	22.2	28.5
Kano	11.3	36.2	26.8	25.7
National	**24.3**	**23.5**	**23.5**	**28.8**

Table 6: Main Sources of Water Supply for Domestic Use

Zone	Sources of Water Supply for Households Domestic Use								
	From the Stream	From the Well	From the Street Tap water	From the In-house Tap	From a Tanker	From the Borehole	Rain Water	Water Vendors	Number studied
North West	9.6	45.8	13.9	15.2	0.9	9.4	0.1	4.9	1313
North East	4.2	40.4	15.4	9.4	0.3	19.7	0.1	9.8	1452
North Central	12.6	40.3	12.0	8.1	2.5	18.6	0.0	4.8	1378
South West	9.7	45.8	17.6	5.3	0.7	15.6	0.1	4.0	1072
South East	23.4	18.5	9.9	3.1	8.1	32.6	1.1	1.6	946
South South	35.2	15.1	14.5	2.3	0.3	30.8	0.6	0.0	1060
National Average	14.7	35.6	14.0	7.7	1.9	20.3	0.3	4.6	7221

4.2 Ownership and use of Insecticide Treated Nets

Tables 7 and 8 show the proportion of households that owned any type of mosquito nets according to socio-economic status disaggregated by geopolitical zones and states, respectively. Net ownership was lower among households in the lower socio-economic class. In general, similar patterns were observed across geopolitical zones and states.

Table 9 shows the proportion of households that owned different types of mosquito nets. Proportion of households that owned at least one insecticide treated net (ITN/LLINs) was 23.3%. The proportion of households that owned ordinary mosquito nets was 11.3%. The levels of household ownership of ITN/LLINs were similar in urban and rural location. The ownership of ITN/LLINs and ordinary mosquito nets differ marginally between urban and rural households (see Figure 3).

Table 7: Percentage distribution of respondents who owned any type of nets according to socio-economic class by geopolitical zone

Geopolitical Zones	**Socio-economic class**			
	SES-D	**SES-C**	**SES-B**	**SES-A**
North West	24.2	27.4	33.2	46.2
North East	29.2	36.5	41.5	52.4
North Central	22.7	24.3	27.7	39.8
South West	23.0	22.2	26.2	33.1
South East	18.6	31.5	34.6	32.1
South South	24.6	26.1	26.1	34.7
National	**24.4**	**28.0**	**31.5**	**40.6**

Table 8: Percentage distribution of respondents who owned any type of nets according to socio-economic class by states

State	Socio-economic class			
	SES-D	SES-C	SES-B	SES-A
Lagos	14.0	28.9	22.6	33.0
Oyo	5.4	5.0	7.0	15.4
Ekiti	36.7	42.5	49.4	52.0
Imo	25.0	36.7	42.6	34.7
Enugu	12.9	23.0	24.5	24.2
Ebonyi	20.2	35.6	42.5	40.4
Delta	20.0	20.9	28.7	31.0
Bayelsa	26.4	24.4	23.6	36.0
Cross River	24.4	35.2	24.7	39.2
Yobe	38.9	40.4	51.7	65.4
Borno	26.0	25.8	35.4	43.5
Taraba	31.9	50.7	51.7	54.7
Kaduna	9.5	14.4	15.5	21.2
Sokoto	44.6	43.6	49.2	49.0
Zamfara	29.9	34.4	33.3	49.4
Kwara	14.5	11.7	18.7	32.2
Plateau	20.8	28.7	30.4	44.0
FCT	38.9	38.2	39.3	42.4
Bauchi	19.2	30.8	33.3	44.6
Nasarawa	24.1	20.3	25.2	41.1
Kano	10.0	23.4	37.9	61.5

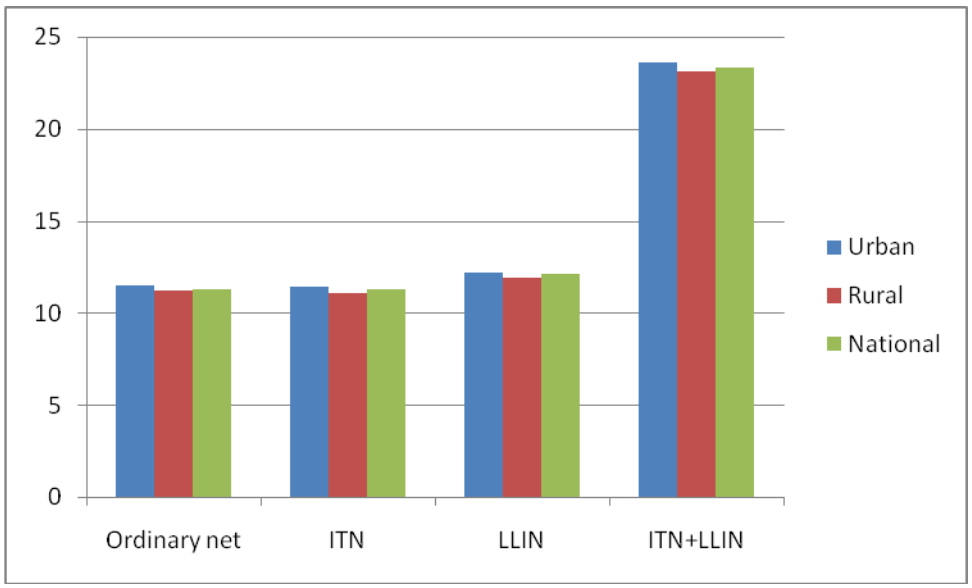

Figure 3: Household Ownership of Mosquito Nets

4.3 Use of Insecticide treated nets by under-five children

Table 9 shows the distribution of ITN/LLIN use among under-fives by state. The lowest levels of ITN/LLIN use among under-fives were observed in Oyo (3.1%), Kaduna (8.3%) and Enugu (9.4%) states. Oyo and Enugu were Global fund round 4 supported states and therefore did not receive GF net during phase one implementation.

Figure 4 shows the proportion of under-five children that slept under ITN/LLIN the previous night. The level of utilisation of ITN/LLINs by under-five children was generally low with a national average of 15.4%. The proportion of under-five children that slept under ITN/LLINs the previous night was higher in the urban areas (16.7%) than rural (14.4%).

Table 9: State distribution of under-five children that slept under ITN/LLIN the previous night

STATE	Under-fives that slept under an insecticide treated bed net the previous night	
	%	Number studied
Lagos	11.8	346
Oyo	3.1	357
Ekiti	28.1	363
Imo	12.3	227
Enugu	9.4	361
Ebonyi	16.5	357
Delta	11.0	345
Bayelsa	11.5	358
Cross River	21.0	357
Yobe	22.9	358
Borno	20.8	360
Taraba	18.9	359
Kaduna	8.3	338
Sokoto	15.3	268
Zamfara	13.4	359
Kwara	13.9	361
Plateau	16.2	358
FCT	19.1	345
Bauchi	16.0	376
Nassarawa	15.8	316
Kano	16.9	354
National	**15.4**	**7223**

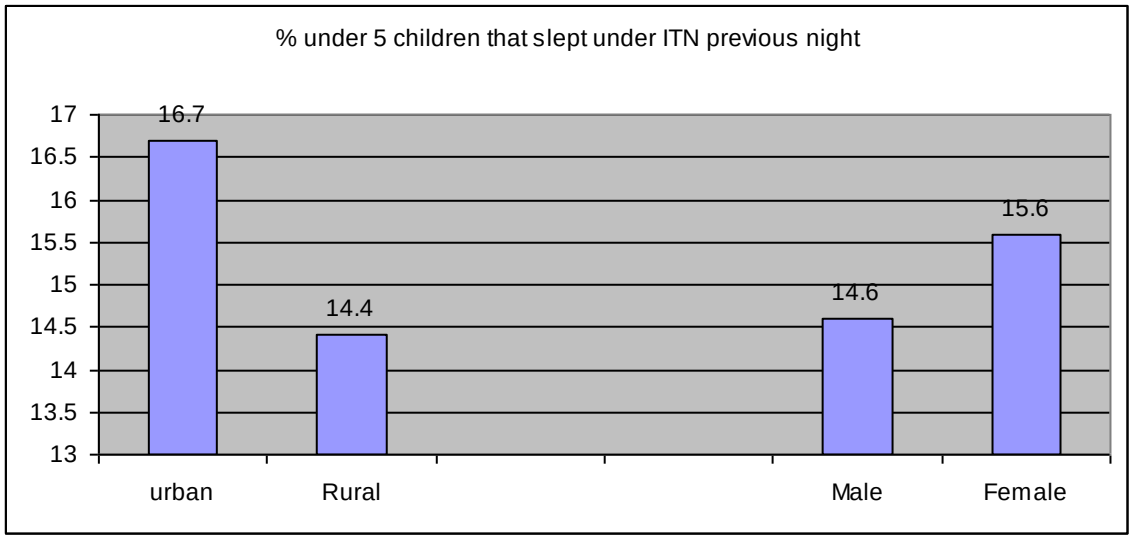

Figure 4: Under-five children that slept under ITN/LLINs the previous night

4.4 Use of Insecticide Treated Nets in Pregnancy

The overall proportion of pregnant women that slept under an ITN the previous night was 13.5%. Table 10 shows that the proportion of pregnant women that slept under ITN the previous night was generally low across all the six geopolitical zones. The level of ITN use in pregnancy was remarkably lower in rural than urban areas (see Figure 5).

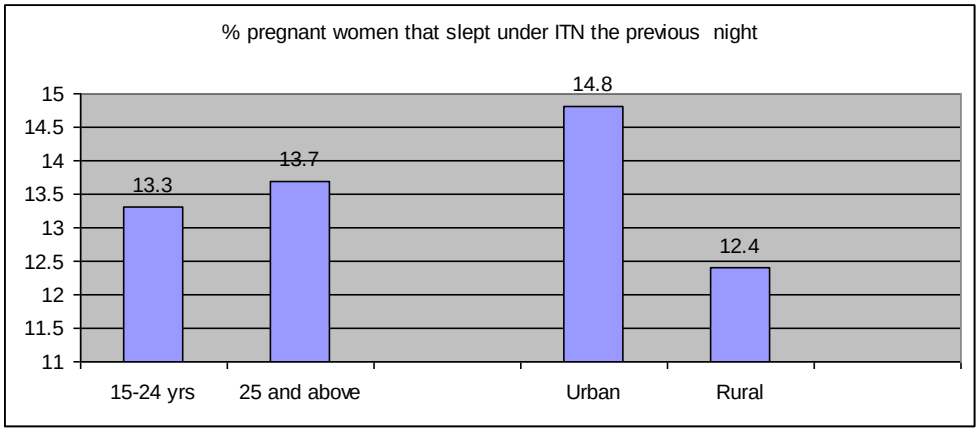

Figure 5: Proportion of pregnant women that slept under an ITN the previous night

Table 10: Proportion of pregnant women that slept under mosquito nets (ITN/LLINs) the previous night

Age group	Number of pregnant women studied	% that slept under a mosquito net (ITN/LLIN)
15-24 yrs	686	13.3
25 and above	1224	13.7
Geopolitical zone		
North West	405	17.5
North East	406	11.6
North Central	363	13.5
South West	238	11.3
South East	215	14.4
South South	296	11.5
Residence		
Urban	853	14.8
Rural	1070	12.4
Ever attended school		
No	349	13.2
Yes	1574	13.5
Age of pregnancy		
First trimester	389	13.9
Second trimester	785	13.6
Third trimester	707	13.6
Do not know	42	4.8
National Average	1923	13.5

4.5 Intermittent Preventive Treatment (IPT) in Pregnancy

Table 11 shows proportion of pregnant women who received sulphadoxine-pyrimethamine (SP) as intermittent preventive treatment (IPT) for malaria in the current pregnancy. The overall rate of IPT use in this sample of pregnant women was 22.5%. The use of IPT was marginally lower in rural (22.0%) than urban dwellers (23.2%) (Figure 6).

Table 11: Proportion of pregnant women that received SP for intermittent preventive treatment (IPT)

Characteristics of respondents	% that received IPT with SP	Number of pregnant women interviewed
Age		
< 25 years	25.7	836
25 years and above	20.8	1512
Residence		
Urban	23.2	1064
Rural	22.0	1284
Zones		
North West	19.5	457
North East	29.6	452
North Central	23.7	452
South West	12.4	348
South East	25.2	298
South South	23.8	341
National	**22.5**	**2348**

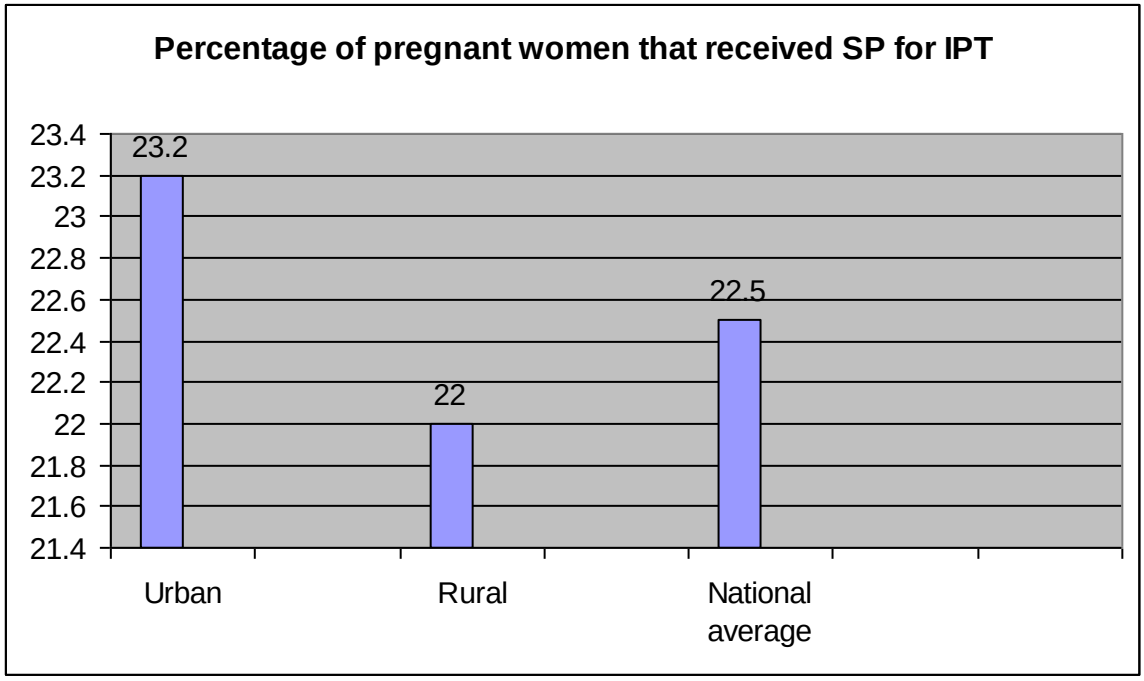

Figure 6: Proportion of pregnant women that received IPT to prevent malaria

Table 12 shows the proportion of women that gave birth in the past two years who received IPT to prevent malaria in pregnancy with a national average of 58.9%.The lowest rate of IPT use is observed in the South West geopolitical zone (39.2%) while the highest was in the North East (78.0%). The urban-rural variation of women that used IPT was marginal. The lowest socio-economic class had the least rate of IPT use in pregnancy.

The rate of IPT use among currently pregnant women was remarkably lower (22.5%) than women that gave birth in the past two years (58.9%).This could partly be explained by the tendency for women in most parts of the country to register for antenatal care very late. Also, 16.7% of the pregnant women involved in this survey were in the first trimester and therefore did not qualify to receive IPT at the time of the survey.

Table 12: Proportion of women that gave birth in the past two years who used IPT

Zone	**Received IPT during the last birth (2 years)**
North West	72.1
North East	78.0
North Central	69.0
South West	39.2
South East	42.8
South South	50.8
Location	
Urban	60.8
Rural	58.7
Socio Economic Class	
Socio class D	53.0
Socio class C	61.1
Socio class B	58.0
Socio class A	61.3
National	**58.9**

4.6 Treatment of Malaria in Under-Five Children

Treatment of malaria or fever was evaluated in one hundred and seventy - three under-five year old children who had fever within 2 weeks of the survey, and whose caregivers had knowledge of ACTs (Figure 7). The survey procedure inadvertently excluded under-fives whose caregivers were ignorant of ACTs. The overall percentage of ill children that received treatment with an ACT within 24 hours of onset of illness was 43.9%.The rate of ACT use was slightly higher in the rural areas (45.9%) than urban (42.9%).

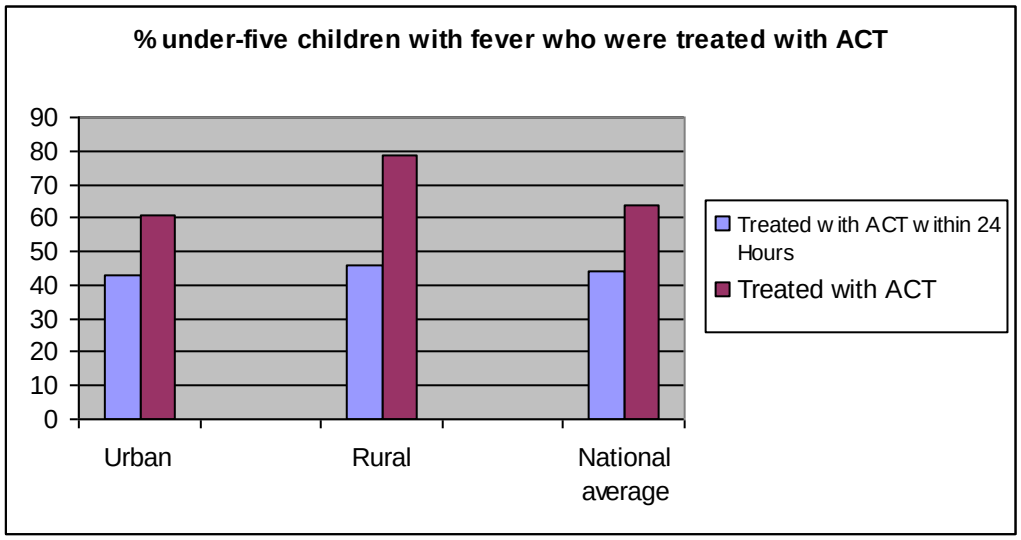

Figure 7: Proportion of under-five children with fever who were treated with ACTs

The level of knowledge of artemisinin based combination treatment (ACT) among caregivers was generally low (Tables 13 and 14). Less than 10% of the caregivers stated that they have heard about artemisinin combination treatments. The highest level of awareness of ACTs was recorded in Cross River State (21.9%) followed by the FCT (18.3%) and Kano State (17.5%).

The generally low level of knowledge of ACTs reported in Table 13 is corroborated by Table 14 which shows that very low proportion of the caregivers could mention the

names of the ACT brands available in the country. For instance, Coartem (the foremost brand of artemether-lumefantrine in the country) was mentioned by only 2.9% of all the caregivers interviewed. The reasons for the observed low level of ACT awareness may not be obvious from the information obtained in this survey but are likely to be related to suboptimal use of information, education and communication (IEC) strategies, the lack of a "programme brand" for ACTs and the "consumer confusion" that may have arisen from multiplicity of ACT and oral artemisinin monotherapy brands in the Nigerian market.

Table 13: Proportion of caregivers that have heard of antimalarial medicine called ACT

States	Percentage frequency of response to the question: "Heard of Antimalarial Medicine called ACT?"		
	No	Yes	Number studied
Lagos	93.4	6.6	346
Oyo	99.4	0.6	357
Ekiti	93.9	6.1	363
Imo	88.5	11.5	226
Enugu	90.8	8.6	327
Ebonyi	89.6	10.4	357
Delta	95.7	4.3	345
Bayelsa	93.3	6.7	357
Cross River	78.1	21.9	356
Yobe	88.0	12.0	357
Borno	89.4	10.6	360
Taraba	87.2	12.8	359
Kaduna	97.9	2.1	338
Sokoto	94.4	5.6	268
Zamfara	95.8	4.2	359
Kwara	89.7	10.3	360
Plateau	95.3	4.7	358
FCT	81.7	18.3	344
Bauchi	89.1	10.9	376
Nassarawa	93.7	6.3	316
Kano	82.5	17.5	354
National	90.8	9.2	7183

Table 14: Caregivers' knowledge of specific brands of ACTs

States	Percentage frequency of ACTs brands mentioned by caregivers					
	Coartem	Larimal	Artecom	Artesunate-Amodiaquine	Artequin	Number studied
Lagos	0.3	0.0	0.0	0.3	0.3	346
Oyo	0.0	0.0	0.0	0.0	0.0	357
Ekiti	2.8	0.0	0.0	0.0	0.0	363
Imo	4.8	0.4	0.4	0.4	0.4	227
Enugu	0.3	0.3	0.3	0.6	0.3	361
Ebonyi	2.0	0.0	0.0	0.0	0.3	357
Delta	0.9	0.0	0.6	0.0	0.0	345
Bayelsa	3.1	0.6	0.0	0.0	0.8	358
Cross Rivers	8.1	1.7	1.1	0.0	0.6	357
Yobe	5.0	0.3	0.3	0.3	0.3	358
Borno	7.5	0.8	3.1	0.6	1.7	360
Taraba	5.6	1.7	1.9	0.6	1.1	359
Kaduna	0.3	0.0	0.0	0.0	0.0	338
Sokoto	1.9	0.7	0.0	0.0	0.0	268
Zamfara	2.5	0.0	0.0	0.3	0.0	359
Kwara	5.3	0.3	0.3	0.3	0.0	361
Plateau	1.1	0.6	0.0	0.3	0.3	358
FCT	5.2	1.2	0.0	1.7	0.0	345
Bauchi	1.9	0.5	0.0	0.3	0.0	376
Nassarawa	0.3	0.6	0.6	0.0	0.0	316
Kano	2.3	1.1	0.0	1.4	0.0	354
National	**2.9**	**0.5**	**0.4**	**0.3**	**0.3**	**7223**

4.7 Treatment of Malaria in Pregnancy

Table 15 shows the incidence of self-reported malaria among pregnant women within two months of the survey. About a third of the pregnant women who were interviewed had malaria. The incidence of malaria was slightly higher among pregnant women in rural areas than their urban counterparts. Also the incidence of malaria increased with gestational age.

Table 16 shows the types of action taken by pregnant women to treat malaria. Majority of the women received treatment in government hospitals and health centres (50.9%). Chemists or patent medicine vendors (21%) and private hospitals/clinics (15%) were the second and third most commonly used health care providers respectively (see Figure 8).

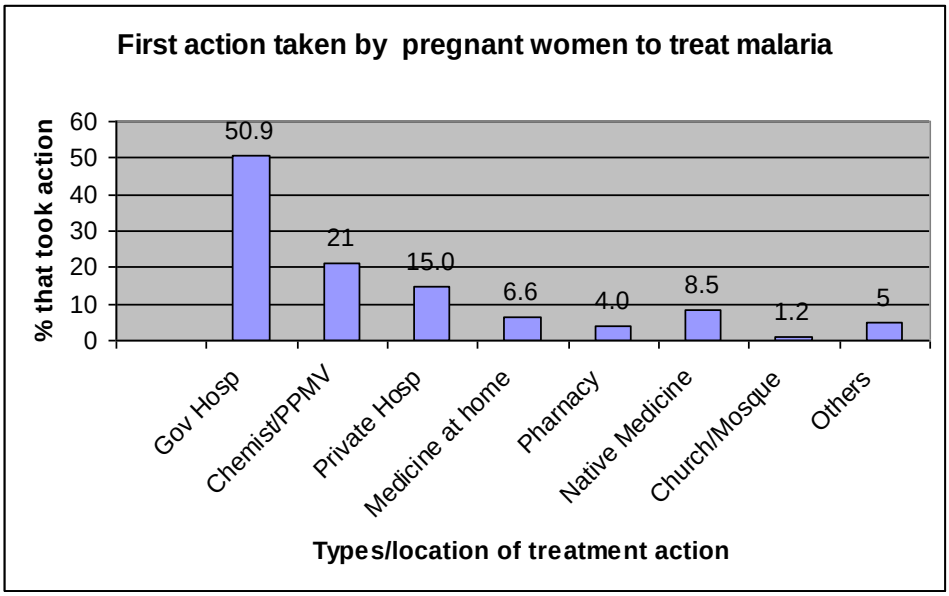

Figure 8: Action taken by 848 pregnant women to treat malaria

Table 15: Antenatal Care Attendance and Incidence of Malaria in Pregnant Women

Characteristics of pregnant women studied	% of pregnant women that registered for ANC or had malaria in last 2 months		
	Number studied	Registered for Antenatal Care	Had Malaria in last 2 months
Age group			
15-24 yrs	823	51.3	35.4
25 and above	1512	54.6	36.5
Geopolitical zone			
North West	457	36.5	37.5
North East	452	50.7	38.5
North Central	452	61.9	30.5
South West	348	56.6	33.8
South East	298	75.2	38.3
South South	341	44.3	38.8
Residence			
Urban	1064	58.1	34.9
Rural	1284	49.1	37.1
Ever Attended School			
No	453	39.5	31.8
Yes	1895	56.4	37.1
Age of pregnancy			
First trimester	472	16.7	29.8
Second trimester	968	52.0	37.4
Third trimester	851	76.9	38.4
Do not know	57	21.1	31.6
National average	2348	53.2	36.1

Table 16: Action taken by pregnant women to obtain treatment for malaria

Types of action taken to treat malaria	% frequency of types of action taken in geopolitical zones*						
	North West (n=171)	North East (n=174)	North Central (n=138)	South West (n=119)	South East (n=114)	South South (n=132)	National (N=848)
Went to Govt. Hospital	48.0	61.5	50.0	56.3	44.7	42.4	50.9
Went to Chemist/PPMV	28.7	24.7	7.2	13.4	14.9	32.6	21.0
Went to Private Hospital/Clinic	7.6	8.6	24.6	16.0	29.8	9.1	15.0
Used Malaria Medicine at Home to Treat Self	7.0	6.9	4.3	7.6	9.6	4.5	6.6
Went to Pharmacy	0.6	2.3	7.2	5.0	2.6	7.6	4.0
Took Native Medicine	9.4	4.0	4.3	10.9	10.5	13.6	8.5
Church/Mosque/Herbalist	0.6	0.6	1.4	0.0	1.8	3.0	1.2
Others	7.0	3.4	8.0	6.7	2.6	1.5	5.0

4.8 Community Knowledge of Malaria Control

Knowledge of the cause of malaria

Table 17 shows caregivers' knowledge of the cause of malaria. The proportion of caregivers that expressed knowledge of mosquito bites as the cause of malaria was over 70% in most of the states. A remarkable proportion of the caregivers in some of the southern states mentioned "staying in the sun for too long", "working too hard/stress" and "eating too much palm/groundnut oil" as causes of malaria.

Table 17: Caregivers' knowledge of the cause of malaria

States	Percentage frequency of caregivers' responses on the cause of malaria							
	Staying in the Sun for too Long	Not Resting Enough/No Sleep	Drinking too much Alcohol/Beer	Mosquito Bites	Witchcraft/ Juju	Eating too Much Palm/ Groundnut Oil	Working too Hard/ Stress	Number Studied
Lagos	40.8	19.9	3.5	68.2	2.3	3.8	37.3	346
Oyo	60.0	20.3	2.8	66.5	1.7	2.3	47.6	355
Ekiti	60.9	6.9	1.1	55.9	1.7	1.7	48.8	363
Imo	26.4	4.0	8.4	69.6	3.5	44.9	12.8	227
Enugu	36.8	8.9	6.4	85.6	2.5	21.3	23.0	361
Ebonyi	32.5	5.0	6.2	76.8	2.2	22.4	31.4	357
Delta	20.1	8.1	8.4	57.8	2.3	5.8	21.8	344
Bayelsa	59.8	6.2	5.6	88.5	1.4	8.4	36.0	356
Cross Rivers	48.7	8.1	9.0	58.8	6.4	21.3	30.8	357
Yobe	20.7	7.0	2.0	92.2	1.4	3.4	12.0	333
Borno	16.9	14.4	5.0	92.8	2.2	5.3	20.3	360
Taraba	19.5	7.2	4.5	90.0	1.7	13.9	17.5	359
Kaduna	4.1	5.3	13.0	74.3	6.8	3.6	4.7	338
Sokoto	7.1	4.1	6.3	62.3	7.5	3.7	5.2	268
Zamfara	1.7	0.6	0.6	98.1	0.3		1.1	359
Kwara	52.2	18.7	6.1	65.9	4.5	2.8	37.7	358
Plateau	4.2	3.9	1.7	83.0	4.7	1.7	5.0	358
FCT	28.7	7.3	5.0	74.9	3.2	6.1	19.9	342
Bauchi	2.9	1.1	1.6	93.6	1.6	1.9	2.1	376
Nassarawa	17.7	4.1	2.2	90.5	1.9	7.9	4.1	316
Kano	11.9	11.0	2.8	78.2	5.4	19.5	9.6	353
National	27.6	8.3	4.8	77.7	3.0	9.1	20.8	7186

Knowledge of the symptoms and signs of malaria

Table 18 shows caregivers' knowledge of symptoms of uncomplicated malaria. Hotness of the body/high temperature (fever) was spontaneously mentioned by most caregivers across the states as a symptom of malaria with a national average of 76.5%. Headache (44.8%) was the second most commonly mentioned symptom followed by weakness/dizziness (34.5%).

Table 18: Knowledge of symptoms of uncomplicated malaria

States	Percentage frequency of symptoms mentioned spontaneously as symptoms of uncomplicated malaria							
	Hotness of the Body/ High Temperature	Dark Coloured Urine	Joint Pains	Headache	Loss of Appetite	Vomiting	Weakness/ Dizziness	Number of respondents
Lagos	67.1	21.4	30.1	49.7	22.3	13.3	36.7	346
Oyo	79.3	39.2	35.3	42.9	19.3	15.1	31.9	357
Ekiti	79.3	20.7	28.4	52.6	30.6	14.0	28.7	363
Imo	73.6	25.6	33.9	70.5	41.0	30.8	58.6	227
Enugu	77.8	33.8	20.2	64.0	47.1	16.9	51.0	361
Ebonyi	65.8	40.6	33.9	42.6	24.1	17.9	30.5	357
Delta	65.5	17.1	15.1	44.6	27.5	9.6	44.6	345
Bayelsa	67.9	28.2	17.9	34.6	41.6	14.5	38.5	358
Cross River	62.2	42.9	26.6	40.1	21.0	14.6	28.3	357
Yobe	85.2	4.2	22.6	40.8	23.5	23.2	38.3	358
Borno	74.4	12.8	34.4	52.8	35.3	45.8	36.4	360
Taraba	86.1	15.3	28.7	44.8	35.9	47.9	34.5	359
Kaduna	74.3	15.7	25.7	33.1	17.8	12.4	16.6	338
Sokoto	77.6	9.3	11.9	22.8	18.7	16.0	19.4	268
Zamfara	84.7	6.4	19.2	25.9	12.8	16.7	22.8	359
Kwara	72.3	28.8	39.3	56.2	18.6	16.6	38.5	361
Plateau	87.4	6.4	16.8	41.9	27.9	22.1	40.2	358
FCT	75.4	9.9	16.8	41.4	24.1	17.4	41.4	345
Bauchi	79.3	9.3	12.5	39.4	9.3	18.1	30.3	376
Nassarawa	90.2	24.1	19.3	54.4	29.4	19.6	40.2	316
Kano	81.9	10.7	13.8	50.6	31.6	19.8	23.2	354
National	76.5	20.1	23.9	44.8	26.5	20.0	34.5	7223

Table 19 and Figure 9 show caregivers' knowledge of the signs of severe malaria. The percentage of caregivers who recognised the signs of severe malaria were generally low. The most commonly mentioned sign of severe malaria was "extreme weakness" (40.9%), followed by convulsion (15.6%). Severe signs of malaria such as "vomiting everything" and "coma" were recognised by very few caregivers (10.3% and 8.1% respectively)

Table 19: Caregivers' knowledge of signs of severe malaria

STATES	Percentage frequency of caregivers' response						
	Extreme Weakness	Convulsion	Confusion/ Disorientation/ Delusion	Coma	Difficulty in Breathing	Vomiting everything	Total studied
Lagos	35.5	6.9	6.9	4.0	4.3	7.5	346
Oyo	24.1	9.2	8.3	6.3	8.3	6.6	349
Ekiti	35.8	12.4	8.8	6.9	8.5	3.9	363
Imo	52.0	37.9	23.3	16.3	22.0	12.8	227
Enugu	63.7	13.6	6.1	1.9	3.0	5.0	361
Ebonyi	40.8	6.8	7.6	1.1	3.9	1.1	355
Delta	51.0	13.3	8.1	8.7	2.0	4.9	345
Bayelsa	51.1	12.0	15.9	3.4	2.5	3.6	358
Cross River	35.6	14.8	12.9	9.5	11.5	11.5	357
Yobe	55.6	20.1	7.0	9.8	11.5	19.4	358
Borno	40.0	22.2	8.3	5.3	7.5	10.6	360
Taraba	40.4	15.9	4.7	16.2	13.1	19.2	359
Kaduna	17.8	12.1	6.8	7.4	7.7	4.4	338
Sokoto	20.9	13.8	9.3	7.1	8.2	9.7	268
Zamfara	36.2	14.5	12.3	4.2	5.8	10.0	359
Kwara	42.9	25.5	16.9	13.6	12.7	15.2	361
Plateau	40.5	16.2	6.7	12.3	12.0	15.6	358
FCT	51.6	27.7	8.2	7.0	11.4	12.2	343
Bauchi	39.4	13.0	17.8	13.0	7.7	8.2	376
Nassarawa	35.4	13.9	6.0	1.9	2.8	2.5	316
Kano	45.8	12.7	4.8	16.7	6.2	32.5	354
National	40.9	15.6	9.7	8.1	8.0	10.3	7211

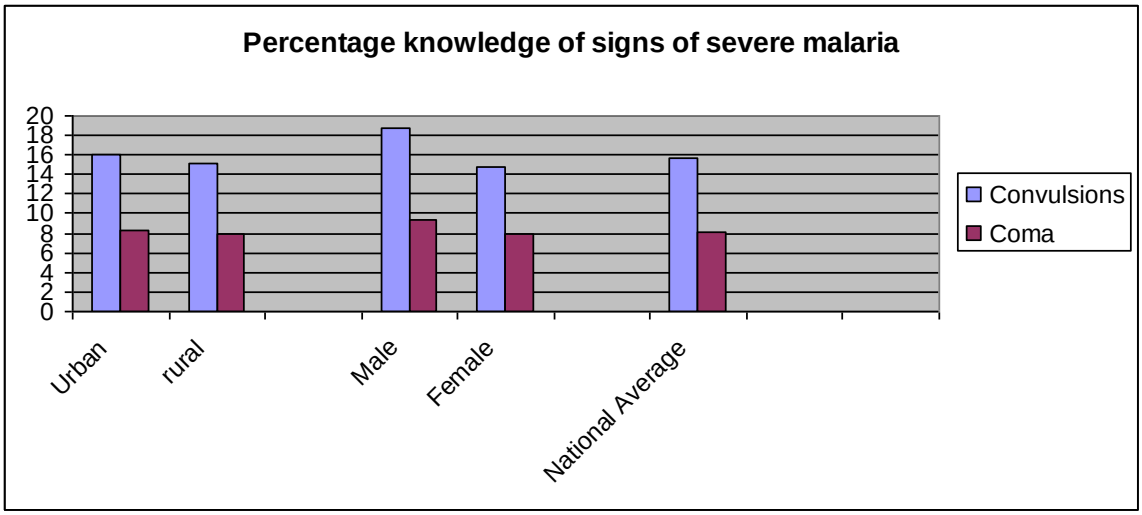

Figure 9: Caregiver knowledge of signs of severe malaria

Knowledge of harmful effects and the prevention of malaria in pregnancy

Table 20 shows the level of knowledge among pregnant women regarding the harmful effects of malaria in pregnancy. While 85% of the respondents indicated that malaria fever was harmful during pregnancy, a smaller proportion could identify specific harmful effects. Abortion, still-birth and low birth weight were mentioned by about a third of the respondents. A relatively small percentage of respondents identified anaemia as a harmful effect of malaria in pregnancy.

Knowledge of measures used by pregnant women to prevent malaria is illustrated in Figure 10. The most common preventive measure mentioned was "using insecticide (spray) to kill mosquitoes before sleeping" (37.8%), followed by use of insecticide treated net (ITN/LLINs, 25.1%). Other commonly mentioned preventive measures were "destroying breeding places" (25%), use of mosquito coils (23.5%), "taking antimalarial drug daily or weekly" (20.9%) and use of ordinary bed net (16.2%).

Table 20: Knowledge of harmful effects of malaria in pregnancy

Harmful effects of malaria in pregnancy	% frequency response in geopolitical zones						
	NC	NE	NW	SE	SS	SW	National
(Number pregnant women studied)	(450)	(453)	(456)	(291)	(333)	(351)	(2334)
Think malaria fever is harmful during pregnancy	88.7	88.7	90.4	92.1	91.6	86.3	89.5
Abortion	38.2	28.3	22.8	23.8	20.6	33.7	28.2
Still Birth	29.1	27.0	21.8	32.3	23.9	30.4	27.1
Low Birth Weight	21.6	31.0	20.3	32.7	34.3	24.4	26.9
Bleeding During Pregnancy	6.0	18.9	16.0	11.9	26.8	7.9	14.5
Anaemia	9.5	11.2	7.7	42.4	10.1	5.3	13.2
Others	19.6	9.7	18.6	24.9	21.2	18.8	18.3
Don't Know	13.1	23.6	25.2	8.2	12.1	13.5	16.8

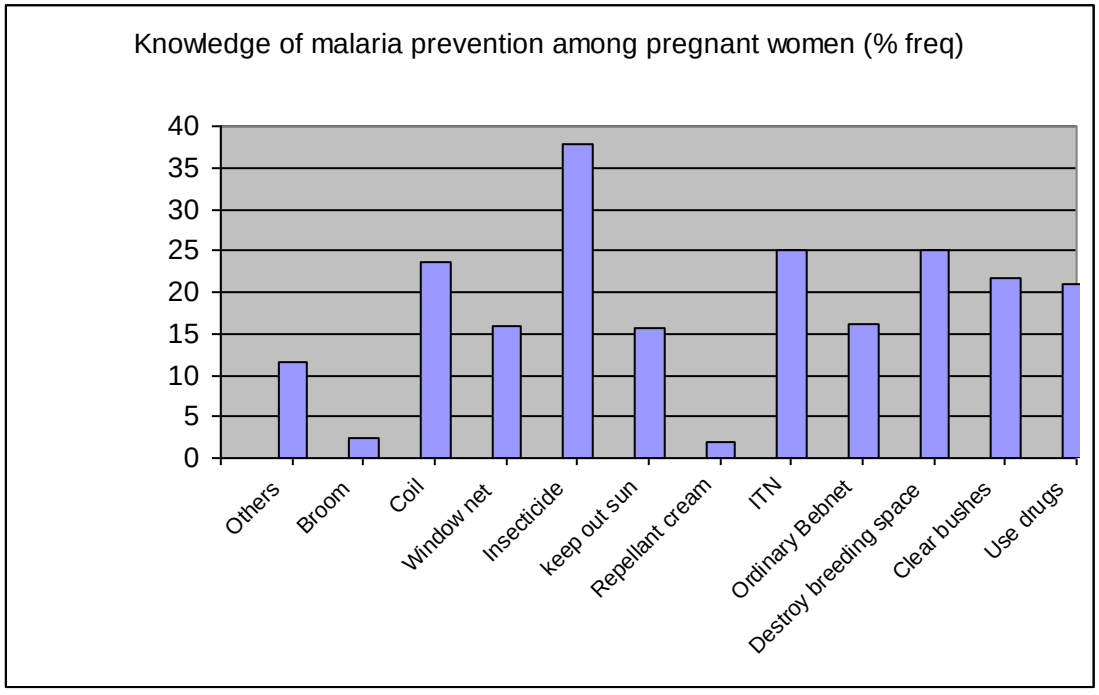

Figure 10: Knowledge of malaria prevention among pregnant women

Caregivers' knowledge of malaria preventive measures

Tables 21 and 22 show the knowledge of caregivers regarding methods used for preventing malaria. Seventy-five per cent of the caregivers could mention at least one correct method for preventing malaria. The use of insecticide spray was the most frequently mentioned method (40.3%), followed by "destroying places where mosquitoes breed" (26.2%) and sleeping under insecticide treated nets (25.5%). Mosquito coil was mentioned by an average of 23.4% of the caregivers.

Table 21: Caregivers' knowledge of at least one preventive measure against malaria

Characteristics	Percentage frequency of caregiver response		
	Caregivers who mentioned at least one preventive method	Caregiver knowledge of fever and at least one preventive method	Number studied
Sex			
Male	83.6	66.2	1374
Female	74.0	58.4	5849
Residence			
Urban	77.6	60.6	3356
Rural	74.3	59.2	3867
National	75.8	59.9	7223

Table 23 shows caregivers' views on the availability of insecticide treated nets. Approximately a third of caregivers in both urban and rural areas indicated that they did not "know where to get insecticide treated nets (ITN/LLINs)". Also about half of them disagreed with the statement that "nets could be found nearby"; while approximately two thirds disagreed with the statement that "nets could be found easily in neighbourhood shops". These observations are indicative of suboptimal ITN/LLIN availability or access as well as low private sector participation in distribution of ITN/LLINs within these communities.

Table 22: Caregivers' knowledge of methods used to prevent malaria (%)

States	Taking Malaria Medicine Every Day/Weekly	Clearing Bushes Around the House	Destroying Places where Mosquitoes Breed	Sleeping under Ordinary Bed Net	Sleeping under Insecticide Treated Net	Using Mosquito Repellent Creams	Keeping Out of the Sun	Using Insecticide to Kill Mosquitoes Before Sleeping	Using Nets on Windows & Doors	Using Mosquito Coils	Number studied
Lagos	45.1	21.4	21.4	6.6	18.2	6.4	16.8	38.4	19.4	10.1	346
Oyo	52.7	22.8	23.7	4.8	9.0	9.0	25.4	35.8	23.1	28.5	355
Ekiti	37.5	14.3	13.5	6.1	15.2	1.7	44.4	11.6	14.6	5.8	363
Imo	46.7	24.2	22.0	7.5	5.7	2.2	11.0	21.6	20.3	4.0	227
Enugu	18.6	22.7	28.8	17.2	18.0	4.2	31.9	48.8	28.3	12.2	361
Ebonyi	14.0	28.0	50.7	25.5	40.9	4.2	24.4	24.9	11.2	6.4	357
Delta	18.1	23.4	24.0	10.2	11.1	3.5	18.7	33.0	26.6	7.3	344
Bayelsa	44.7	25.3	15.7	23.6	27.0	2.5	36.8	50.3	18.3	28.7	356
Cross River	46.5	45.1	17.4	13.7	19.9	7.3	15.7	18.2	17.1	14.6	357
Yobe	10.6	24.9	29.6	49.2	46.1	4.2	16.2	58.7	19.6	63.1	333
Borno	15.0	26.7	31.7	26.9	33.1	10.3	15.0	56.9	20.0	40.6	360
Taraba	8.6	44.6	49.6	26.7	37.3	4.2	6.7	53.5	20.9	25.9	359
Kaduna	6.3	32.7	28.3	16.1	15.8	8.9	11.9	22.9	13.4	11.0	338
Sokoto	5.6	7.1	9.0	17.9	17.5	8.2	11.6	16.8	15.3	21.6	268
Zamfara	2.5	5.6	13.1	56.3	23.7	0.6	5.3	57.1	11.4	60.4	359
Kwara	45.0	32.2	28.6	7.8	8.3	4.4	17.2	30.0	13.1	9.4	358
Plateau	2.8	15.4	15.9	21.8	26.0	2.2	2.2	62.8	16.8	19.8	358
FCT	14.8	27.6	32.6	16.9	41.9	1.7	14.0	47.4	21.5	8.4	342
Bauchi	6.6	23.4	30.9	14.9	36.7	2.4	5.6	64.6	8.5	27.9	376
Nassarawa	17.1	11.4	28.2	40.2	38.3	0.3	9.5	55.7	23.1	16.8	316
Kano	9.3	17.2	31.1	8.5	37.6	4.2	9.6	23.4	5.6	58.8	353
National	22.1	23.8	26.2	20.1	25.5	4.4	16.9	40.3	17.4	23.4	7186

Table 23: Caregivers' views on the availability of mosquito nets (ITN/LLINs)

Statements	Percentage frequency of responses				
	Strongly Disagree	Somewhat Disagree	Somewhat Agree	Strongly Agree	Number interviewed
Know where I Can Get a Net					
Urban	25.3	10.1	14.5	50.1	3342
Rural	26.3	10.9	16.7	46.1	3852
National	25.9	10.5	15.7	48.0	7194
Nets are not Usually Available Close By					
Urban	29.8	20.3	22.4	27.4	3341
Rural	28.9	24.0	20.5	26.7	3852
National	29.3	22.3	21.4	27.0	7193
Can Easily Get a Net from a Shop within my Village/ Neighbourhood					
Urban	44.4	24.2	15.9	15.5	3340
Rural	46.9	26.7	14.6	11.9	3852
National	**45.7**	**25.5**	**15.2**	**13.6**	**7192**

4.9 Community Media Exposure

Table 24 and Figure 11 show the proportion of caregivers in each of the states in the survey that listened to the radio and those that actually heard malaria campaign on radio during the festive season. The national average of caregivers that listened to radio was 64.2%, with Kano State having the highest percentage of listeners (92.7%) and Taraba the lowest (39.3%).

Table 24: Caregivers that listen to radio or heard malaria campaign on radio

STATE	**Listens to radio**		**Heard malaria campaign on radio**	
	%	Number interviewed	%	Number interviewed
Lagos	58.1	346	28.9	201
Oyo	75.6	357	11.9	270
Ekiti	81.3	363	39.0	295
Imo	65.5	226	18.9	148
Enugu	62.0	321	12.6	201
Ebonyi	62.4	356	37.1	222
Delta	49.4	344	29.0	169
Bayelsa	64.3	356	48.2	228
Cross River	52.5	356	34.8	187
Yobe	63.6	357	45.4	227
Borno	63.9	360	34.8	230
Taraba	39.3	359	30.5	141
Kaduna	60.7	338	37.6	205
Sokoto	64.2	268	44.7	170
Zamfara	77.4	359	3.6	278
Kwara	64.7	360	11.2	234
Plateau	50.6	358	19.3	182
FCT	60.5	344	63.8	207
Bauchi	70.5	376	37.0	265
Nassarawa	68.4	316	33.8	216
Kano	92.7	354	40.2	328
National	**64.2**	**7174**	**31.5**	**4605**

The overall percentage of caregivers that actually heard malaria campaign on radio during the festive season was 31.0%. The FCT had the highest number of listeners (63.8%) while Zamfara had the lowest (3.6%).

Figure 11 shows that the percentage of caregivers that listened to radio or malaria campaign on radio was lower among rural and illiterate caregivers than their urban and educated counterparts.

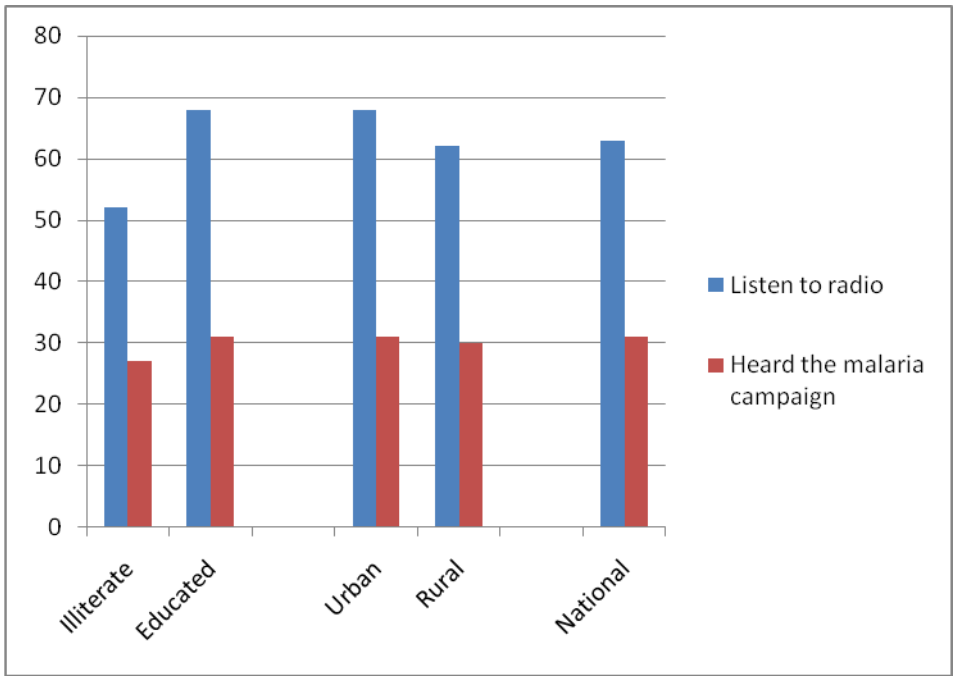

Figure 11: Percentage of caregivers who listened to radio or heard malaria campaign on radio

Key radio messages recalled by caregivers

Table 25 shows the key messages that caregivers recalled from the malaria campaign on radio. The most frequently recalled messages were those about the dangers of malaria to children under-five years (24.5%) and pregnant women (19.1%) and that malaria can kill (26.2%). The role of mosquitoes in transmitting malaria was the least frequently recalled further corroborating the observed deficiencies and misconceptions about the cause of malaria.

Table 25: Caregiver recall of key messages from malaria campaign on radio

Key Messages recalled			
	Urban (n = 2226)	Rural (n = 2378)	**National** (N=1430)
Malaria is Dangerous for Children Under-five	24.2	24.9	24.5
Malaria is Dangerous for Pregnant Woman	19.7	18.5	19.1
Malaria Can Kill	25.2	27.2	26.2
Mosquitoes Causing Malaria Usually Bite in the Night	10.0	8.7	9.4
Mosquito Can Carry Malaria from One Person to Another	8.4	10.0	9.2
With LLIN, You Can Sleep Peacefully (koole)	18.6	12.5	15.6
It Is Factory Treated	10.9	8.4	9.7
Travel with LLIN. It Is a Better Companion	8.7	6.1	7.4
Protect Your Family with LLIN	24.1	22.5	23.3
Using Long Lasting Insecticides Treated Nets (LLIN) is Affordable	12.8	8.1	10.5

5.0 Summary of Findings, Programme Implications and Recommendations

Tables 1 and 26 show a summary of the core programme and other malaria control indicators as captured in this survey. The results of this survey show a general trend towards improvement of several core malaria control indicators. The proportion of households that owned at least one insecticide treated net (ITN/LLIN) was 23.3%. The proportion of children under-five years of age and pregnant women who slept under ITNs/ LLINs the previous night were 15.4% and 13.5% respectively. The proportion of women that gave birth in the past two years who received IPT was 58.9%. The proportion of currently pregnant women that received intermittent preventive treatment (IPT) for malaria was 22.5%. The lower rate of use recorded among these women may be related to late registration for antenatal care, and the fact that a significant proportion of them were still in their first trimester and therefore not qualified for IPT. While these coverage rates were a significant improvement over the results of a major 2005 national survey (that involved 7000 households in twelve states spread across the six geo-political zones), they still fell short of the current national strategic target of 80%.

Analysis based on a relatively small survey sample showed that 43.9% of children under-five years of age with malaria were treated with an ACT within 24 hours of onset. A larger survey sample would be needed to ascertain whether this result truly represents the situation since surveys involving small samples have the tendency to result in overestimation of rates. If we assume that the coverage rate observed in this survey represents the true situation, it would indicate a remarkable improvement in community access to prompt and effective treatment for uncomplicated malaria, but this coverage rate still falls short of the national strategic target of 80%.

A good proportion (> 50%) of caregivers recognised the symptoms of uncomplicated malaria and could mention at least one preventive measure against malaria (core programme indicator) but the proportion that could recognise the signs of severe malaria was low (< 20%).

Table 26 shows several indicators that reflect knowledge, attitude and practice of the caregivers regarding various malaria control services and commodities. While most of the indicators, especially those that were related to recognition of symptoms and knowledge of where to get mosquito nets or services, were relatively high actual use of services notably ITN/LLINs and IPT remain low. These findings suggest inadequate supply, limited access or low community demand for these malaria control services and commodities. These survey results are also indicative of rather low level of participation of private sector providers in the delivery of the key preventive services namely ITN/LLINs and IPT.

A key objective of the revised Phase2 of the Global Fund Round 4 grant is to increase informed demand for ACT, SP and LLINs through Information, Education, Communication/Behaviour Change Communication and advocacy activities targeted at households, communities and caregivers. The survey results show low community knowledge of ACT. This may be partly due to the fact that these brands are relatively new and there are also too many of them in the Nigerian market. It would appear that in the absence of a distinct "ACT brand", consumers have become overwhelmed by the proliferation and confusing brands of ACT and oral artemisinin monotherapies. The Phase 2 programme of the Global Fund Round 4 grant is a good opportunity to develop a programme brand for ACTs, scale up BCC and advocacy activities with a view to increasing the coverage and quality of treatment of malaria within the community. This is particularly crucial for the success of home management of malaria (HMM) which is a key component of the national malaria control strategy.

The survey has also highlighted variations in community awareness, coverage rates for both treatment and prevention services across states, geo-political zones and urban and rural areas. There is a need to carefully review programme input and processes with a view to achieving equitable programme delivery, improving quality and coverage of services, and closing observed coverage gaps.

Table 26: Summary of Survey Indicators

	INDICATOR	National	Rural	Urban	GF States
1	% of caregivers who correctly cite symptoms of uncomplicated (fever) malaria in children of all caregivers with children under 5 years interviewed whether they have heard of malaria or not	76.5	77.6	75.4	75.4
2	% of caregivers who correctly cite symptoms of severe (convulsions) malaria in children of all caregivers with children under 5 years interviewed whether they have heard of severe malaria or not	15.6	15.1	16.1	16.0
3	% of U5 children (and other target groups) with malaria/fever receiving appropriate treatment within 24 hours (community/health facility)*	43.9	45.9	42.0	48.3
.4	% of children U5 sleeping under an ITN the previous night	15.4	14.4	16.7	15.3
5	% of households with at least one ITN in the household	23.3	23.1	23.6	22.8
6	Proportion of caregivers who can mention at least one preventive measure against malaria	75.8	74.3	77.8	73.6
7	% of pregnant women (and other target groups) sleeping under an ITN the previous night	13.5%	12.4	14.8	13.5
8	% of pregnant women on Intermittent preventive treatment (IPT)	22.5	22.0	23.2	20.8
9	% of caregivers who know that they must seek treatment from an appropriate health facility for	46.4	45.3	47.6	44.1

	convulsions immediately after the symptoms appear of all caregivers with children under 5 years interviewed whether they have heard of convulsions or not.				
10	% of caregivers that consider pre-packaged anti-malarial drugs for children under 5 years affordable	63.4	64.9	62.4	62.4
11	% of caregivers that consider pre-packaged anti-malarial drugs for children under 5 years easy to obtain	79.8	75.6	82.3	80.2
12	% of caregivers that have heard of mosquito nets over the bed.	84.1	84.1	84.2	82.7
13	% of caregivers that know where to buy these bed nets treated with insecticides.	63.1	62.8	63.4	62.1
14	% of children under-five who received a full course of appropriate anti malarial treatment (defined as Artemisinin based combination therapy – ACTs) within 24 hours of all children surveyed who had fever in the last 2 weeks*	43.9	45.9	42.0	48.3
15	Percentage of caregivers who consider ACT PPT affordable	63.4	64.9	62.4	62.4
16	Percentage of caregivers who have heard of ACTs PPT of all caregivers surveyed	9.2	6.5	12.3	8.7

*Please note that data on indicators #3 and #14 were derived from a relatively small (and therefore non-representative) sample of sick children.

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Annex A

States and Local Government Areas Involved in the Survey

STATES	LOCAL GOVERNMENT AREAS									
Lagos	Ajeromi Ifelodun	Alimosho	Eti- Osa	Ibeju-Lekki	Ikeja	Kosofe	Mushin	Ojo	Surulere	Afijio
Oyo	Ibadan South East	Ibadan North West	Ibadan South West	Ibarapa North	Ibarapa South	Iseyin	Ogbomosho North	Orelope	Oyo West	Oyo East
Ekiti	Ado Ekiti	Efon	Ekiti East	Ekiti West	Ikole	Irepodun/ Ifelodun	Ise/Orun	Moba	Oye	
Imo	Ahiazu-Mbaise	Ehime-Mbano	Ideato North	Ikeduru	Isu	Ngor-Okpala	Okigwe	Orlu	Oru-West	Owerri-Municipal
Enugu	Enugu East	Enugu North	Enugu South	Ezeagu	Nkanu West	Nsukka	Oji-River	Udenu	Udi	Uzo-Uwani
Ebonyi	Abakaliki	Afiko North	Ebonyi	Ezza North	Ezza South	Ishielu	Izzi	Ohaozara	Ohaukwu	Onicha
Delta	Patani	Ethiope West	Ika South	Isoko North	Oshimili North	Sapele	Ugheli North	Ukwuani	Warri South	-
Bayelsa	Kolokuma/ Opokuma	Ekeremor	Nembe	Ogbia	Sagbama	Southern Ijaw	Yenagoa	-	-	-
Cross River	Abi	Akpabuyo	Bekwara	Biase	Calabar South	Calabar Municipal	Ikom	Obubra	Obudu	-
Yobe	Bade	Damaturu	Fune	Tarmuwa	Gujba	Jakusko	Nangere	Karasuwa	Potiskum	Gulani
Borno	Asira-Uba	Biu	Damboa	Dikwa	Jeer	Konduga	Kukawa	Maiduguri	Ngala	-
Taraba	Gashaka	Donga	Gassol	Ibi	Jalingo	Karim/Lamido	Ardo-Kola	Takum	Wukari	Zing
Kaduna	Birnin-Gwari	Ikara	Kachia	Kaduna Chikun	Kaduna North	Kauru	Kubau	Sabon-Gari	Soba	Zaria

Sokoto	Bodinga	Dange Shuni	Illela	Kware	Sokoto North	Sokoto South	Tambu wal	Wamakko	Wurno	-
Zamfara	Bakura	Birnin-Magaji	Bungudu	Gusau	Kaura Namoda	Maru	Shinkafi	Talata Mafarawa	Tsafe	-
Kwara	Baruten	Ekiti	Ifelodun	Ilorin East	Ilorin South	Ilorin West	Irepodu n	Moro	Oyun	-
Plateau	Bassa	Jos North	Jos South	Kanam	Langtang South	Mikang	Quan-Pan	Wase	-	-
FCT	Abaji	Amac	Bwari	Gwagalad a	Kuje	Kwali	-	-	-	-
Bauchi	Alkaleri	Bauchi	Darazo	Ganjuwa	Itas/Gadau	Katagum	Misau	Ningi	Toro	-
Nassarawa	Akwang a	Doma	Karu	Keffi	Lafia	Nassarawa		Obi	Toto	-
Kano	Ajingi	Bunkure	Doguwa	Gezawa	Gwale	Gwarzo		Kibiya	Nasarawa	Wudil

Annex B

Survey Personnel and Technical Team

Technical Committee Members.

Names	**Organisation**
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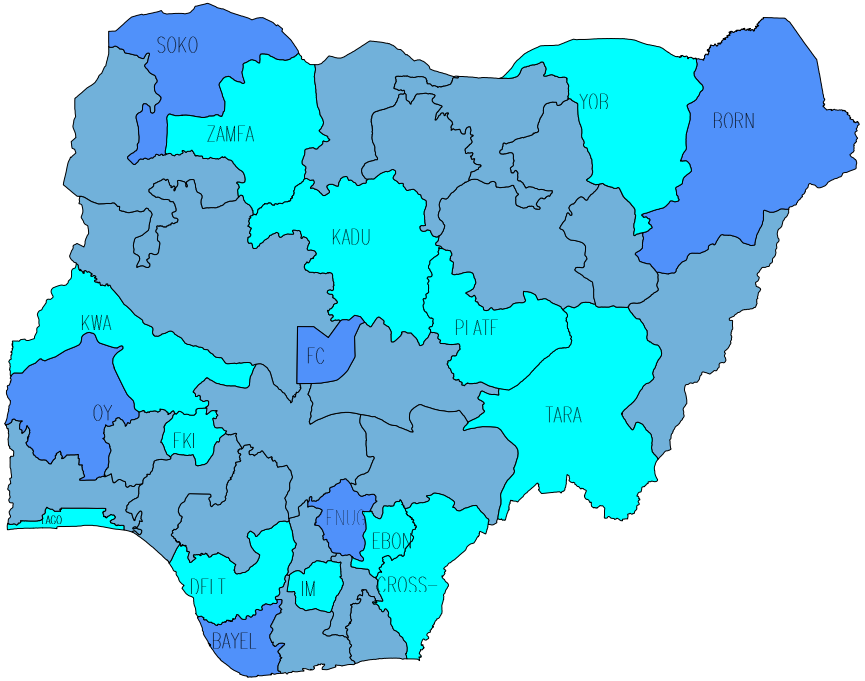
Arogundade Ekundayo	Society for Family Health,Abuja.
Kolo Yaro Yakubu	Society for Family Health, Abuja


SOKO
ZAMFA
YOB
BORN
KADU
KWA
PLATF
FC
OY
FKI
TARA
FNUK
EBON
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CROSS-
BAYEL

Society for Family Health

Federal Ministry of Health Abuja

Yakubu Gowon Centre