

Malaria is a major public health concern in Nigeria. According to recent estimates, half of the Nigerian population has at least one episode of malaria annually, and the majority of outpatient visits can be attributed to malaria (FMOH, 2001). *Plasmodium falciparum*, transmitted by the anopheles mosquito, is responsible for the majority of malaria deaths in Nigeria, and the groups most at risk are children under five years of age and pregnant women. Pregnant women are vulnerable because their natural immunity is reduced; thus, they are four times more likely to suffer from complications of malaria than nonpregnant women. Malaria is a cause of pregnancy loss, stillbirth, low birth weight, and neonatal mortality (Jamison et al., 1993). Individuals with sickle cell and other low immune groups are also at higher risk.

Malaria negatively impacts the social and economic development of communities in Nigeria. It is responsible for school absenteeism and low productivity at workplaces and on farms. The Federal Government policy on malaria control in Nigeria focuses on the following main interventions: 1) management of cases, 2) prevention of malaria with insecticide-treated nets (ITN), and 3) use of intermittent preventive treatment (IPT) during pregnancy. Health promotion monitoring and evaluation are cross-cutting activities.

10.1 MOSQUITO NETS

Ownership of Mosquito Nets

All households in the 2003 Nigeria Demographic and Health Survey (NDHS) were asked whether they own a mosquito net, and if so, how many. Table 10.1 shows the percentage of households with at least one, and more than one, mosquito net (treated or untreated), and the percentage of households that have at least one, and more than one ITN, by background characteristics.

Table 10.1 shows that ownership of mosquito nets is not widespread in Nigeria. Only 12 percent of households report that they own at least one net. Two percent of households report that they own an ITN. Prevalence of mosquito net ownership varies greatly by residence and region. Rural households are three times as likely as urban households to own at least one mosquito net. Furthermore, ownership ranges from less than 1 percent in the South West to 22 percent in the North East. It is notable that the least advantaged household (in terms of the wealth index) have the highest levels of mosquito net ownership. Whereas 23 percent of the households in the lowest quintile own at least one net, only 3 percent of households in the highest quintile report ownership.

Use of Mosquito Nets

In the 2003 Nigeria NDHS, respondents to the Household Questionnaire were asked about the use of mosquito nets by household members during the previous night. The use of mosquito nets by children under five and pregnant women is of special interest for public health purposes.

Since the prevalence of malaria-carrying mosquitoes varies seasonally, with a peak during and immediately following periods of rainfall, use of mosquito nets may be expected to follow a similar seasonal pattern. The 2003 NDHS fieldwork was conducted from March to August, which is the rainy season in most areas of Nigeria. Thus, the data collection coincided with the period when mosquito nets are most likely to be used.

Table 10.1 Ownership of mosquito nets

Percentage of households with at least one and more than one mosquito net (treated or untreated), and percentage of household that have at least one and more than one insecticide treated net (ITN), by background characteristics, Nigeria 2003

Background characteristic	Percentage of households that have:				Number of households
	At least one net	More than one net	At least one ITN ¹	More than one ITN ¹	
Residence					
Urban	5.4	2.7	1.0	0.4	2,598
Rural	15.5	8.7	2.9	1.5	4,627
Region					
North Central	14.9	9.6	3.9	2.7	1,040
North East	22.1	12.3	1.3	0.8	1,185
North West	13.3	7.8	3.1	1.5	1,911
South East	5.8	2.1	2.4	0.8	690
South South	10.5	4.9	2.0	0.7	1,315
South West	0.5	0.1	0.3	0.0	1,083
Wealth quintile					
Lowest	23.0	13.9	4.5	3.1	1,413
Second	15.5	8.9	1.3	0.3	1,347
Middle	10.8	5.2	2.4	1.0	1,408
Fourth	8.0	4.1	2.1	1.0	1,446
Highest	3.3	1.6	1.0	0.3	1,611
Total	11.8	6.6	2.2	1.1	7,225

¹ An insecticide treated net (ITN) is a permanent net that does not require any treatment, a pretreated net obtained in the past six months, or a net that has been soaked with insecticide in the past six months.

Tables 10.2 and 10.3 show the percentages of children under five years of age, all women age 15-49, and pregnant women who slept under a mosquito net the night before the survey and the percentage who slept under an ITN, by background characteristics. Six percent of children under five slept under a mosquito net including 1 percent of children who slept under an ITN. Approximately twice as many rural as urban children slept under a mosquito net (7 and 4 percent, respectively). There are marked differences by region; for example, whereas 9 percent of children in the South South and in the North Central slept under a net the night preceding the survey, no children in the South West were reported to have slept under a net.

Six percent of all women and 5 percent of pregnant women slept under a mosquito net the night before the survey, approximately one-fourth of them under an ITN (Table 10.3). Similar to children, women in rural areas are several times more likely than their urban counterparts to have slept under a net. There are also significant differences by region.

Table 10.2 Use of mosquito nets by children

Percentage of children under five years who slept under a mosquito net the night before the survey and percentage who slept under an insecticide treated net (ITN), by background characteristics, Nigeria 2003

Background characteristic	Percentage of children who slept under a mosquito net the night before the survey		Number of children
	Any net	ITN ¹	
Age			
<1	6.7	1.3	1,412
1	6.9	1.5	1,078
2	5.2	0.9	1,171
3	6.5	1.4	1,192
4	4.1	0.7	1,008
Sex			
Male	6.3	1.1	2,986
Female	5.6	1.2	2,875
Residence			
Urban	3.6	0.6	1,787
Rural	7.0	1.4	4,074
Region			
North Central	8.9	2.7	854
North East	6.8	0.4	1,349
North West	5.0	1.7	1,965
South East	4.4	1.3	365
South South	8.6	0.5	774
South West	0.0	0.0	554
Total	5.9	1.2	5,861

¹ An insecticide treated net (ITN) is a permanent net that does not require any treatment, a pretreated net obtained in the past six months, or a net that has been soaked with insecticide in the past six months.

Table 10.3 Use of mosquito nets by pregnant women

Percentage of all women and pregnant women age 15-49 who slept under a mosquito net (treated or untreated) the night before the survey, and the percentage who slept under an insecticide treated net (ITN), by background characteristics, Nigeria 2003

Background characteristic	Percentage of women who slept under a mosquito net the night before the survey		Number of women	Percentage of pregnant women who slept under a mosquito net the night before the survey		Number of pregnant women
	Any net	ITN ¹		Any net	ITN ¹	
Residence						
Urban	2.6	0.5	2,801	3.2	0.4	254
Rural	7.1	1.8	5,340	6.2	1.6	629
Region						
North Central	8.2	2.6	1,207	9.2	1.6	108
North East	8.4	0.5	1,468	8.4	1.7	197
North West	5.0	2.1	2,235	4.0	1.1	352
South East	2.9	1.4	774	2.0	1.5	51
South South	6.6	1.0	1,434	5.0	1.5	115
South West	0.3	0.1	1,023	0.0	0.0	60
Total	5.6	1.4	8,141	5.4	1.3	883

¹ An insecticide treated net (ITN) is a permanent net that does not require any treatment, a pretreated net obtained in the past six months, or a net that has been soaked with insecticide in the past six months.

10.2 ANTIMALARIAL DRUG USE DURING PREGNANCY

Pregnant women who carry the malaria parasite may be at risk of serious problems that jeopardize their own health, that compromise the health of the foetus, and that increase the likelihood of adverse pregnancy outcomes such as stillbirth, spontaneous abortion, and low birth weight. As a protective measure, in 2001 the Federal Ministry of Health recommended that pregnant women receive IPT using two doses of sulfadoxine-pyrimethamine (SP) during the second and early in the third trimester of pregnancy.

In reference to the pregnancy leading to their last live birth, women in the 2003 NDHS were asked whether any antimalarials were taken during the pregnancy and which drug(s) was taken. Table 10.4 presents the percentage of women who had a birth in the last five years preceding the survey who took an antimalarial or other drug during the most recent pregnancy for prevention, and the percentage who received IPT as part of their antenatal care, by background characteristics.

Twenty percent of women report that they took an antimalarial during their last pregnancy. Another 17 percent report that they took an unknown drug, and 4 percent took paracetamol or herbs to prevent malaria. Only 1 percent received IPT during an antenatal care visit.

Among women who took an antimalarial for prevention during pregnancy, there are significant differentials by background characteristics. Urban women are more than twice as likely as rural women to have taken an antimalarial. By region, prevalence ranges from a low of 8 percent in the North East to a high of 32 percent in the South East.

Table 10.4 Use of intermittent preventive treatment (IPT) by pregnant women

For the last birth in the five years preceding the survey, percentage for which the mother took antimalarial drugs for prevention during the pregnancy and percentage for which the mother got intermittent preventive treatment (IPT) during an antenatal visit, by background characteristics, Nigeria 2003

Background characteristic	Percentage of women who:				Number of pregnant women
	Took anti-malarial for prevention during last pregnancy	Took unknown drug during last pregnancy	Took Paracetamol or herbs during last pregnancy	Received IPT ¹ during ANC visit	
Residence					
Urban	34.0	19.3	5.7	2.0	1,144
Rural	14.8	15.7	3.4	0.6	2,766
Region					
North Central	17.1	19.2	5.3	0.7	575
North East	7.9	19.8	5.1	0.9	862
North West	21.4	4.0	0.8	1.2	1,341
South East	31.9	32.9	2.6	0.2	222
South South	29.2	30.4	3.6	1.3	544
South West	31.4	22.2	13.3	1.1	367
Total	20.4	16.7	4.1	1.0	3,911

¹ Intermittent preventive treatment is preventive treatment with sulfadoxine-pyrimethamine (SP/Fansidar) during an antenatal visit.

Table 10.5 shows the different antimalarial drugs that were taken by the 20 percent of pregnant women who reported preventive use of antimalarials. More than half (58 percent) of these women used Daraprim/Metaprim, which has been found to be ineffective as a chemoprophylaxis during pregnancy (FMOH, 2001). Additionally, 39 percent used chloroquine, which was the chemoprophylactic drug of choice until the introduction of IPT in 2001. Although it is only two years since the introduction of the new IPT recommendation, it is worthy of note that 12 percent of the women who took an antimalarial for prevention used SP/Fansidar. Other antimalarials, Halfan and Amodiaquine, were used by 2 and 1 percent of women, respectively. A larger percentage of urban women than rural women used each of the drugs with the exception of chloroquine. More than 4 in 10 women in all regions use Daraprim/Metaprim. Use of Daraprim/Metaprim is highest in the North West, North East, and South South (74, 63, and 51 percent, respectively).

Table 10.5 Use of specific drugs for Intermittent Preventive Treatment (IPT)

For mothers who took antimalarial drugs for prevention during the last pregnancy leading to a live birth in the five years preceding the survey, percentage who took a specific drug, by background characteristics, Nigeria 2003

Background characteristic	Percentage of women who took:					Number of women who took antimalarial drug
	SP/Fansidar	Chloroquine	Halfan	Daraprim/Metaprim	Amodiaquine	
Residence						
Urban	14.1	31.6	3.1	63.5	1.2	390
Rural	9.1	46.4	1.4	51.7	0.4	408
Region						
North Central	6.8	55.1	1.8	40.1	0.0	99
North East	17.7	25.5	0.0	63.1	0.0	68
North West	15.3	26.1	2.6	74.1	0.8	286
South East	13.3	36.6	8.1	41.9	0.5	71
South South	6.7	46.6	1.8	51.4	0.9	159
South West	8.3	58.0	0.0	45.6	2.1	115
Total	11.6	39.2	2.2	57.5	0.8	798

10.3 TREATMENT OF CHILDREN WITH FEVER OR CONVULSIONS

Since the major manifestations of malaria are fever and convulsions or fits, mothers were asked whether their children under age five had had a fever, convulsions, or fit in the two weeks preceding the survey. If reported, the mother was asked if the child was given any drugs.

Table 10.6 shows that 32 percent of children under age five had a fever and/or convulsions in the two weeks preceding the survey. Among those sick with fever/convulsions, one-third took antimalarial drugs, and one-quarter received the drugs the same day as the onset of the fever/convulsions or the following day. There are striking differences in both morbidity and treatment by region. Children in the North East and North West were the most likely to have been ill during the two weeks preceding the survey (39 and 36 percent, respectively), while children in the South West were the least likely (18 percent). Although children in the South West were least likely to be sick, they were most likely to have received an antimalarial in response to their symptoms. Forty-three percent of sick children in the South West took an antimalarial compared with 27 percent in the North East, one of the regions with the highest levels of morbidity, and just 15 percent in the South East.

Table 10.6 Prevalence and prompt treatment of fever/convulsions

Percentage of children under age five with fever and/or convulsions in the two weeks preceding the survey, and among children with fever and/or convulsions, percentage who took antimalarial drugs and who took the drugs the same/next day, by background characteristics, Nigeria 2003

Background characteristic	Percentage of children with fever/convulsions	Number of children	Among children with fever and/or convulsions, percentage who:		Number of children with fever/convulsions
			Took antimalarial drugs	Took antimalarial drugs same/next day	
Age					
<1	33.4	1,331	29.3	19.5	445
1	40.0	999	36.3	23.8	399
2	34.0	1,050	41.7	32.3	356
3	27.4	1,067	32.3	25.3	292
4	21.9	899	27.1	23.2	196
Sex					
Male	31.6	2,717	32.5	22.9	858
Female	31.6	2,628	35.2	26.4	832
Residence					
Urban	27.8	1,620	38.5	30.1	450
Rural	33.3	3,726	32.2	22.7	1,239
Region					
North Central	24.2	781	32.2	23.6	189
North East	38.5	1,225	27.0	17.9	471
North West	36.0	1,818	39.6	31.7	654
South East	23.6	347	14.8	13.6	82
South South	30.0	684	36.2	18.8	206
South West	18.0	489	43.2	34.6	88
Total	31.6	5,345	33.9	24.6	1,689

Table 10.7 presents the percentage of children under five who took antimalarial drugs for fever and/or convulsions in the two weeks preceding the survey, by background characteristics. Ninety-seven percent took the first line drug, chloroquine, 1 percent took the second line drug, Fansidar/SP, and 4 percent took other antimalarials. The data show that children of all age groups received the antimalarials, indicating that equal care is given to children of all ages under five. Almost three-quarters of children received the antimalarial the same day as the onset of symptoms or the next day. Promptness of treatment varies significantly by region.

Table 10.7 Type and timing of antimalarial drugs

Among children under age five who took antimalarial drugs for fever and/or convulsions in the two weeks preceding the survey, percentage who took first-line drug, second-line drug, or other antimalarial drugs and percentage who took each type of drug the same/next day after developing fever and/or convulsions, by background characteristics, Nigeria 2003

Background characteristic	Percentage who took:						Number of children who took antimalarial drugs
	First-line drug	First-line drug same/next day	Second-line drug	Second-line drug same/next day	Other antimalarial	Other antimalarial drug same/next day	
Age in years							
<1	98.4	66.0	0.4	0.0	1.6	0.5	130
1	95.7	63.2	2.0	0.0	5.8	3.3	145
2	96.7	75.2	1.5	1.0	5.9	3.1	149
3	98.7	77.0	1.0	1.0	1.3	1.3	95
4	94.7	81.2	1.0	0.0	4.3	4.3	53
Sex							
Male	97.2	68.8	1.2	0.0	3.1	2.0	279
Female	96.8	73.0	1.3	0.8	4.8	2.8	293
Residence							
Urban	97.8	76.5	1.5	0.4	3.9	3.2	173
Rural	96.6	68.5	1.1	0.4	4.0	2.0	399
Region							
North Central	94.3	68.5	1.3	1.3	4.5	3.5	61
North East	96.4	63.1	0.4	0.0	4.0	3.0	127
North West	99.4	79.2	0.7	0.7	3.5	2.2	259
South East	(91.7)	(83.3)	(0.0)	(0.0)	(8.3)	(8.3)	12
South South	92.9	50.6	4.8	0.0	5.7	1.2	75
South West	(96.7)	(80.2)	(1.3)	(0.0)	(1.9)	(0.0)	38
Total	97.0	70.9	1.2	0.4	4.0	2.4	572

Note: According to national policy, chloroquine is the first-line drug and SP/Fansidar is the second-line drug. Figures in parentheses are based on 25-49 unweighted cases.