Original Article

Demographic Factors Associated with Insecticide Treated Net use Among Nigerian Women and Children

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Abstract

Background: Malaria constitutes a major health problem, with children and pregnant women being the most vulnerable to its morbidity and mortality. **Aim:** To determine the demographic factors associated with the use of insecticide-treated nets among children and pregnant women in Nigeria. **Materials and Methods:** The study was based on data drawn from the Nigeria Demographic and Health Survey 2008 on the use of insecticide-treated nets among women and children. The survey was conducted in 34070 households and a total of 10,724 women aged 15-49 years participated in the survey. Data were entered into Minitab version 15 and the chi-square test for independence was performed to show association between variables. **Results:** The results revealed that 49.8% of children and 44% of pregnant women present in households that owe insecticide-treated nets slept under them on the night before the survey. Sleeping under an insecticide-treated nets among children was associated with (P<0.05) the age of a child, geopolitical zone, and wealth quintile while the use of insecticide-treated nets among pregnant women was associated with the education level and wealth quintile of households. **Conclusion:** The study demonstrated that some demographic factors are associated with the use of ITNs among children and pregnant women in Nigeria.

Keywords: Children, Demographic factors, Insecticides-treated nets, Pregnant women

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Introduction

Malaria constitutes a major health problem with about 300-500 million clinical cases and more than one million deaths annually. Children and pregnant women are the most vulnerable to malaria morbidity and mortality. Every 40 s, a child dies of malaria resulting in more than 2000 deaths per day among children worldwide.[1] Malaria affects maternal health and pregnancy outcome. It causes anemia in pregnancy which increases the risk of maternal deaths with an estimated 10,000 maternal deaths annually attributed to maternal anemia.[2,3] Malaria in pregnancy also causes low birth weight, preterm delivery, congenital infection, and reproductive loss.[2] Over 90% of malaria burden occurs in Sub-Saharan Africa.[4]

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Malaria is endemic in Nigeria, with a prevalence of 919 per 100 000 population and remains one of the leading cause of morbidity and mortality. It accounts for 30% and 11% of child and maternal deaths, respectively.[5] The economic impact of malaria in Nigeria is enormous with about ₦132 billion lost annually.[6]

Insecticide-treated nets (ITNs) have been shown to be the most cost effective measures in the prevention of malaria.[7,8] ITNs have been shown to reduce malaria mortality by 17% in children below the age of five.[8] In view of the effectiveness of ITNs, the Roll Back Malaria Partnership (RBM) targets to protect 80% of children and pregnant women at risk for malaria with ITNs by 2015.[9] Nigeria, has also established policy guidelines for the implementation and scaling-up use of ITNs in accordance with the provision of Abuja declaration and its national strategic plan.[5] The Malaria prevention programme in Nigeria was expected to provide about 60 million ITNs by the end of 2010.[10] Consistent use of these nets is important in the prevention of malaria.

Some demographic factors have been identified as

important predictors of ITNs use including gender, wealth, access to health care, education, and ethnicity.[11] This study was aimed at determining the demographic factors associated with the use of ITNs among children and pregnant women in Nigeria.

Materials and Methods

Study design

The study was based on data drawn from the Nigeria Demographic and Health Survey (NDHS) 2008. In the survey, women aged 15-49 years from selected households were interviewed. The survey collected data on demography, ownership of an insecticide treated net, number of children who slept under an ITN on the night preceding the survey, and number of women age 15-49 (including women who were pregnant at the time of the survey) who slept under an ITN on the night preceding the survey.

The survey considered an ITN as a factory treated net not requiring any further treatment, or a pretreated net/net soaked with an insecticide within 12 months preceding the survey.

Study population

The survey was conducted in 34,070 households and a total of 10,724 women aged 15-49 years participated in the survey.

Sampling procedure

The respondents for the 2008 NDHS were obtained through a stratified two-stage cluster design. Nigeria is divided into states. Each state is subdivided into local government areas (LGAs), and each LGA is divided into localities.[12] The 2008 NDHS subdivided each locality into convenient areas called census Enumeration Areas (EAs) which constitutes the primary sampling unit referred to as a cluster. In the first stage, 886 clusters, consisting of 286 and 600 clusters from urban and rural areas respectively were selected from localities in each local government area of the country. The second stage involves selecting an average of 41 households per cluster.[12]

Data analysis

Data Analysis was performed in two stages. In the first stage, data drawn from the NDHS were entered into Minitab version 15 statistical software and the chi-square test was performed to show association between the use of ITNs and demographic variables. The second stage involved calculating unadjusted odd ratio (OR) and the respective 95% confidence interval (CI) to determine the strength of association.

Results

The 2008 NDHS showed that only 8.0% of Nigerian households were in possession of at least one ITN with an average of 0.1 ITN per household. Applying Chi-square test to the results in [Table 1] shows that the ownership of an ITN in Nigeria was associated (P<0.05) with place of residence, geopolitical zone and the wealth quintile of household. Urban households, households from the South East and South South geopolitical zones, and those of the highest wealth quintile possessed a significant (P<0.05) number of ITNs than their corresponding counterparts [Table 1].

Only 49.8% of the children present in households that owe ITNs slept under an ITN on the night before the survey [Table 2]. Sleeping under an ITN was found to be associated with (P<0.05) the age of a child, geopolitical zone, and wealth quintile of households. The use of an ITN decreases with an increase in the age of a child and wealth quintile of households. Children below 1 year were two times more likely (OR 2.25) to sleep under an ITN than those of 4-year old and those belonging to families with the lowest wealth quintile were 1.4 times more likely to sleep under an ITN than those from the highest wealth quintile.

About 41% of women living in households having an ITN slept under an ITN the night before the survey. Sleeping under an ITN among Nigerian women was found to be associated with (P<0.05) place of residence, geopolitical zone, education, and wealth quintile of households [Table 3]. The use of ITNs decreases with increasing education level and wealth quintile. Women without formal education were 1.75 times more likely to sleep under an ITN than those with post secondary

Table 1: Households in possession of at least one ITN

Variables	No. of households *n*	Household with ITNs *n* (%)	*P* value*
Residence			0.001
Urban	12100	1041 (8.6)	
Rural	21970	1669 (7.6)	
Geopolitical zone			0.000
North Central	4568	338 (7.4)	
North East	3730	265 (7.1)	
North West	7178	567 (7.9)	
South East	4527	444 (9.8)	
South South	5966	614 (10.3)	
South West	8100	486 (6.0)	
Wealth quintile			0.000
Lowest	6119	245 (4.0)	
Second	6219	386 (6.2)	
Middle	7065	558 (7.9)	
Fourth	7216	699 (9.7)	
Highest	7451	835 (11.2)	
Total	34070	2726 (8.0)	

*P value for Chi-square test

Table 2: Children who slept under an ITN in households with ITNs

Variables	No. of children in households with ITNs	% who slept under an ITN	*P* value*	OR (95% CI)	*P* value**
Age in years					
<1	645	59.3	0.000	2.25 (1.78-2.84)	<0.0001
1	576	55.6		2.20 (1.73-2.81)	<0.0001
2	524	50.6		1.58 (1.24-2.02)	0.0002
3	551	42.1		1.13 (0.88-1.44)	0.3387
4	530	39.3		1.00 (0.78-1.28)[a]	1.0000
Sex of child					
Male	1396	49.8	0.939	1.00 (0.86-1.16)	1.0000
Female	1430	49.9		1.01 (0.87-1.17)[a]	0.9386
Residence					
Urban	1086	47.8	0.088	1.00 (0.85-1.18)[a]	1.0000
Rural	1740	51.1		1.14 (0.98-1.33)	0.0878
Geopolitical zone					
North Central	314	43.3	0.000	1.07 (0.79-1.46)	0.6579
North East	358	41.7		1.00 (0.74-1.35)[a]	1.0000
North West	661	48.8		1.34 (1.03-1.74)	0.0270
South East	456	57.6		1.91 (1.44-2.53)	<0.0001
South South	598	53.4		1.60 (1.23-2.09)	0.0005
South West	439	49.9		1.40 (1.06-1.86)	0.0185
Wealth quintile					
Lowest	269	54.6	0.025	1.44 (1.09-1.90)	0.0097
Second	468	53.0		1.35 (1.07-1.69)	0.0103
Middle	607	51.5		1.27 (1.03-1.57)	0.0248
Fourth	675	49.4		1.16 (0.95-1.43)	0.1447
Highest	806	45.5		1.00 (0.82-1.22)[a]	1.0000
Total	2825	49.8			

*P value for Chi-square test; **P-value for odd ratio; [a]Referent group

Table 3: Women who slept under an ITN in households with ITNs

Variables	No. of women in households with ITNs	% who slept under an ITN	*P* value*	OR (95% CI)	*P* value**
Residence					
Urban	1245	35.3	0.000	1.00 (0.85-1.18)[a]	1.0000
Rural	1957	44.6		1.44 (1.25-1.27)	<0.0001
Geopolitical zone					
North Central	410	40.1	0.000	1.21 (0.92-1.59)	0.1681
North East	356	46.2		1.55 (1.17-2.05)	0.0021
North West	708	45.9		1.54 (1.21-1.95)	0.0004
South East	487	35.5		1.00 (0.77-1.30)[a]	1.0000
South South	699	41.5		1.29 (1.01-1.63)	0.0385
South West	541	35.8		1.01 (0.79-1.31)	0.9106
Education					
No education	748	48.7	0.000	1.75 (1.38-2.22)	<0.0001
Primary	595	47.5		1.67 (1.30-2.14)	0.0001
Secondary	1389	35.9		1.03 (0.83-1.29)	0.7713
Post secondary	469	35.2		1.00 (0.76-1.30)[a]	1.0000
Wealth quintile					
Lowest	277	51.5	0.000	2.32 (1.77-3.03)	<0.0001
Second	452	50.1		2.17 (1.73-2.72)	<0.0001
Middle	641	43.4		1.66 (1.36-2.04)	<0.0001
Fourth	791	42.4		1.59 (1.32-1.93)	<0.0001
Highest	1040	31.5		1.00 (0.83-1.20)[a]	1.0000
Total	3202	40.9			

*P value for Chi-square test; **P-value for odd ratio; [a]Referent group

education, while those of the lowest wealth quintile were 2.32 times more likely to sleep under a net than those of the highest wealth quintile.

The survey revealed that 44% of pregnant women living in households with an ITN slept under it, a night before the survey. The use of ITNs among pregnant women was associated with the education level and wealth quintile. Those without a formal education (OR 2.65) and from the lowest wealth quintile (OR 2.31) were more likely to use

Table 4: Pregnant women who slept under an ITN in households with ITNs

Variables	No. of women in households with ITNs	% who slept under an ITN	*P* value*	OR (95% CI)	*P* value**
Residence					
Urban	130	37.4	0.055	1.00 (0.61-1.65)[a]	1.0000
Rural	237	48.3		1.53 (0.99-2.37)	0.0555
Geopolitical zone					
North Central	37	45.1	0.145	1.70 (0.73-3.97)	0.2207
North East	53	55.7		2.60 (1.20-5.65)	0.0151
North West	93	47.8		1.80 (0.91-3.56)	0.0938
South East	60	36.2		1.16 (0.54-2.48)	0.7057
South South	67	47.3		1.83 (0.88-3.79)	0.1052
South West	57	33.4		1.00 (0.46-2.18)[a]	1.0000
Education					
No education	109	54.3	0.019	2.65 (1.07-6.56)	0.0355
Primary	66	46.8		2.21 (1.01-4.86)	0.0475
Secondary	143	41.5		1.76 (0.87-3.55)	0.1168
Post secondary	49	28.2		1.00 (0.42-2.40)[a]	1.0000
Wealth quintile					
Lowest	35	52.5	0.007	2.31 (1.06-5.04)	0.0355
Second	59	55.1		2.77 (1.43-5.35)	0.0024
Middle	83	53.2		2.46 (1.36-4.47)	0.0031
Fourth	85	41.1		1.53 (0.84-2.77)	0.1644
Highest	105	31.6		1.00 (0.56-1.79)[a]	1.0000
Total	367	44.4			

**P* value for Chi-square test; ***P* value for odd ratio; [a]Referent group

an ITN than those with post secondary education and highest wealth quintile, respectively [Table 4].

Discussion

The study demonstrated that ITN coverage in Nigeria is low and its utilization among women and children is far from the Roll Back Malaria Partnership (RBM) targets to protect 80% of children and pregnant women at risk for malaria with ITNs by 2015. ITN coverage was very low in rural areas, south-west region and households with the lowest wealth quintile. This suggests that these population groups can be target groups for campaigns to increase coverage. Several strategies have been demonstrated to increase ITN coverage and use including integrated campaign during immunization and mass drug treatment. In Zambia, more than 80% coverage and use of ITN was observed when ITN distribution was integrated with immunization campaigns.[13] A study in central part of Nigeria also showed that widespread coverage of ITNs can be achieved through mass drug administration campaign.[14]

The results of this study showed that about 50% of children less than five years old did not sleep under an ITN the night preceding the survey. This result is similar to that found in other studies in Ethiopia (42%), Ghana (49.8%), and Uganda (46%).[4,9]

The results also revealed that children under the age of 1 (infants) were more likely to sleep under an ITN than their older ones; This findings is in agreement with other findings in sub-Saharan Africa and this shows that infants, especially the breastfeeding ones are likely to sleep under an ITN because they share a bed with their mothers.[3,9] In addition, Eisele *et al.*,[9] showed that as children grow older, they lose their access to ITN and suggest the need for increasing intra-household access of ITNs.

Although households from the highest wealth quintile have more ITNs in their possession, children from households with the lowest wealth quintile were more likely to sleep under an ITN than those from the highest wealth quintile. This result is in contrast to findings in Uganda where children in wealthy households were more likely to sleep under an ITN than those of poor households.[3] The high use ITNs in households with the lowest wealth quintile may be associated with their perceived vulnerability as perceived vulnerability to malaria have been shown to be higher in poor households.[3] In addition, the fact that a child from poor household is more likely to share a bed with his parent is a possible explanation for the high use of ITN among children in poor homes than those in wealthy homes.

Conclusion

The study therefore demonstrated that some demographic factors are associated with the use of ITNs among children and pregnant women in Nigeria. Sleeping under an ITN among Nigerian children was associated with the age of a child, geopolitical zone, and wealth quintile of households while the use of ITNs among Nigerian

pregnant women was associated with the education level and wealth quintile.

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