DUTSE JOURNAL OF ECONOMICS AND DEVELOPMENT STUDIES (DUJEDS)
DEPARTMENT OF ECONOMICS AND DEVELOPMENT STUDIES
FEDERAL UNIVERSITY DUTSE
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IMPACT OF MALARIA ON MATERNAL MORTALITY IN NIGERIA

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Abstract
Malaria still remains one of the major public health challenges confronting Nigeria. The study investigates the effect of malaria on maternal mortality rate in Nigeria for the period spanning 1990 to 2017. It utilizes time series variables obtained from secondary source. All the variables are integrated of order one I(1) and have a cointegrating relationship which also necessitated the adoption of error correction methodology (ECM) as an estimation technique. Granger causality analysis was also conducted to examine direction of causation between variables. Estimated results showed that malaria and poverty have a positive and significant impact on maternal mortality rate. The study also found that literacy rate, education of female adults; government health activities and access to improved sanitation are significant determinants of maternal mortality rate in the country. It founds no causality between malaria and poverty in Nigeria. Among other recommendations made was that the government should intensify efforts in its implementation of programs designed to combat malaria such as the free distribution of mosquito treated nets and Private sector organizations should support and compliment government's efforts in alleviating poverty by creating gainful employment for the teeming population. This would help increase their income level and afford them opportunities to demand for healthcare services when need be.

Keys words: Miasma Theory, Malaria, Maternal Mortality, Poverty, Error Correction Model.
JEL Classifications: I15, I32, C29.

Introduction

Malaria still remains one of the major public health challenges confronting Nigeria. Even though considerable efforts have been made over the years to reduce its prevalence by the government and non-governmental organizations, its pervasiveness is still very much high on the children aged fewer than 5 and pregnant women being hit the most. Although it is treatable, curable and preventable, but increasing cases of malaria in Nigeria is so alarming. In Nigeria, studies revealed that malaria is liable for approximately 60 percent of outpatient visits and 30 percent of admissions. It is also believed to contribute up to 11 percent of maternal mortality, 25 percent of infant mortality, and 30 percent of under-5 mortality. It is projected that about 110 million clinically diagnosed cases of malaria and nearly 300,000 malaria-related childhood deaths occur each year (Nigeria Malaria Indicator Survey, 2015).

Available information from World Bank's World Development Indicators (WDI) in 2017 showed that the current implementation of free health care to pregnant women and under-five children seem to be yielding some positive results but Nigeria's Maternal Mortality Rate (MMR) however is yet to reach the reduction rate as recommended by the

Millennium Development Goals (MDGs). Although Nigeria saw a 27% decline in MMR between 2005 (820 per 100,000 live births) and 2010 (630 per 100,000 live births), the country is still among the top 13 highest MMR in the world (WDI, 2017). The World Health Organization (WHO) estimates that over a million children worldwide lose their mothers annually and the children who lose their mothers are 10 times more likely to die prematurely. This shows that countries with high maternal mortality ratios also record high infant and child mortality rates as well (WHO, 2012).

Due to the crucial role a mother plays in the life of a child, Nigeria's current MMR of 630 per 100,000 live births is indicative that critical aspects of the healthcare delivery system like financial and geographic access to care and good quality healthcare delivery services in Nigeria continue to fail women and children (Chukuezi, 2010). According to a United Nations International Children's Emergency Fund(UNICEF) report, some of the major causes of high MMR in Nigeria include haemorrage, obstructed labour, puerperal infection, malaria and complicated abortions (WHO, 2012). Some researchers argue that haemorrage has historically been over reported while puerperal sepsis is always under reported (Hanson, 2010). One of the main reasons being that hospital staff gets blamed for poor hygiene and clinical services when a higher percentage of puerperal sepsis is reported, therefore some mortality due to sepsis is reported as haemorrage (Hanson, 2010). Researchers in Nigeria have reported that puerperal sepsis accounts for 12% of maternal deaths in Nigeria and that till date, little is known about the background hospital factors that predispose pregnant women to puerperal infection that leads to mortality (Okonofua et al., 2012). High maternal mortality has been explained by some researchers to be caused by a combination of individual level factors such as attending ante natal clinics but choosing to deliver at home, at a church or by a traditional birth attendant (Igberase & Ebeigbe, 2007). Others identified women who never attended ante natal clinics but show up at the hospital as emergency cases with varied degrees of complications (Guerrier, Oluyide, Keramarou & Grais, 2013).

In 2015, it was estimated that roughly 303 000 women died during and following pregnancy and childbirth. Almost all of these deaths occurred in low-resource settings, and most could have been prevented (World Health Organization, 2010). Out of the highest maternal rates in the world, Nigeria is having the second highest maternal frequency after India (WHO, 2016). Several factors might have warrant the drastic increment of maternal mortality in Nigeria. Among such factor that influences maternal mortality in Nigeria are ignorance, high blood pressure in pregnancy, diabetes, over feeding, weak healthcare system, low health care utilization and poverty (Usman & Adebayo, 2011; Nwosu, 2012; Ogunjimi, Ibe & Ikorok, 2012,). The Nigeria Malaria Indicator Survey, (2015) reveals that malaria is liable for approximately 60 percent of outpatient visits and 30 percent of admissions. It is also believed to have contributed up to 11 percent of maternal mortality, 25 percent of infant mortality, and 30 percent of under-5 mortality. As a tropical disease common among developing countries characterized by low per capita income, malaria is associated or correlated to poverty (Nkegbe, Kuunibe & Kekyi, 2017).

It is against this background that the study seeks to look at how malaria impact on maternal mortality in Nigeria. To achieve this objective, the following questions need to be answered: i. Does malaria affects maternal mortality in Nigeria? ii. Does poverty influence maternal mortality rate in Nigeria? iii. Is there a link between malaria and poverty in Nigeria? The rest of this paper is structured as follows: Section 2 contains a review of relevant literature while section 3 provides the methodology adopted; section 4 presents the results and discussion and section 5 concludes the paper.

Literature Review

Nkegbe et al (2017) investigated the linkages between poverty and malaria morbidity using count data models, with Jirapa District in the Upper West Region of Ghana as the study area. Empirical results confirm the presence of poverty in the study area as more than half of households depend on heads whose incomes are below the poverty line of US$1 per day and that significant relationships exist between poverty and education on the one hand and malaria morbidity on the other, since gender and level of education of household head, and household poverty situation are significant determinants of malaria morbidity.

Ibrahim (2016) in a study investigated socioeconomic factors that determine maternal mortality in rural communities in Oyo State, Nigeria. The study used a systematic random sampling technique to select 63 communities across the nine LGAs, while the simple random sampling techniques was used to select 2,200 women of child bearing age from the communities. Social Determinants Scale (r=0.73), and economic Determinants Scale (r=0.71) were used in data collection. Obtained data were analyzed using descriptive statistics, multiple regression and content analyses. Results showed that age of respondents was 29+2.1, 84.6% were married,

while 48.1% had their first pregnancy at age 16-20years. There was relative contribution of educational status, proximity to health facilities, level of income and purchasing power on maternal mortality. Proximity to health facilities, level of income, purchasing power, and educational status had significant contribution to mortality. The study discovered that low access to health facilities, level of income, purchasing power and educational status determined maternal mortality in rural communities of Oyo State.

Maigemu and Hassan (2015) in a socioeconomic context examined the influence of malaria as a cause of morbidity and mortality and also assessed the link between malaria and poverty in Zamfara State.The study adopted a cross sectional analysis in a descriptive framework. The results showed that there is a strong relationship between household behavior instrument factors on malaria control in Zamfara State.

Nwanosike, Ikpeze and Ugbor (2015) adopted a time series econometric approach with a scope covering 1970 to 2013 in the investigation of malaria impacts on health outcome in Nigeria. The study illustrated the relationship between health outcome and malaria prevalence in Nigeria. This paper revealed that malaria cases impact on under-five mortality, and the degree of this impact determines the effect of malaria prevalence on health outcome in Nigeria, which are of course low life expectancy and reduction in active labour force.

Nyarko and Cobblah (2014) assessed the determinants of malaria among under-five children in Ghana using a cross sectional primary data set. The study utilized a descriptive analytical framework and found that the highest proportion (22.7%) of malaria under-five was reported among children whose mothers had primary school education, while mothers with higher education reported the lowest (17.4%) malaria cases among such children. The study further found the highest proportion of cases was reported among children whose mothers were from poor households, pointing to the fact that solving the malaria problem even among children might better be done through social and economic interventions rather than scientific-based interventions alone.

Ogunjimi *et al* (2012) in a study assessed how high maternal and child mortality in Africa can be curbed using Nigeria as a case study. The study used primary data obtained from a cross section of nurses in Nigeria. The study found that maternal and child mortality is closely linked to poverty with malnutrition as an underlying contributor in over half of these deaths. The result further indicated that factors associated with these problems include, poor socio-economic development, weak health care system and low socio-cultural barriers to care utilization

Mojekwu and Ibekwe (2012) in a study on examination of intervention methods on maternal mortality in Nigeria brought together some of the determinants of maternal mortality mentioned in extant literature and used simultaneous multiple regression on fourteen variables for maternal mortality modeling in Nigeria. Stepwise regression was then applied to identify, from among the fourteen variables, the major determinant factors that appear to affect maternal mortality ratio more than the others. Data on the 36 states of the federation and the FCT Abuja was obtained from the Nigeria Demographic and Health Survey 2008, the Annual Abstract of Statistics of the National Bureau of Statistics and the Society of Obstetrics and Gynecology of Nigeria. The study found that delivery by a skilled health professional and educational attainment of women had more effect on maternal mortality ratio than the other factors.

Nwosu (2012) in her study identified the causes of maternal mortality in Ohuhu land of South Eastern part of Nigeria using one of the primary health centers, Nkwoegwu Community Health Centre as a case study. Survey and participant observation methods were used to gather data and a thousand (1000) questionnaires were distributed to doctors, nurses and patients. The study revealed the causes of maternal mortality to include ignorance, malaria-in-pregnancy, high BP in pregnancy, over feeding and diabetes.

Usman and Adebayo (2011) examined the effects of malaria on household productivity, expenditure and mortality in Kwara State, Nigeria. The study was motivated by the fact that living in malaria-endemic regions places an economic burden on households even if they do not actually suffer an episode of malaria. Using binary response model, the study analyzed the effect of malaria on productivity, household expenditure and mortality rate. The result obtained showed that differences in household costs of malaria are the product of complex relationships between social, economic and epidemiological factors. The result further showed that malaria infection have negative effects on productivity, treatment cost of all household have a positive effect on private expenditure especially of the marginal groups and malaria infection has a positive effect on mortality rate.

Chukuezi (2010) examined the socio-cultural factors associated with maternal mortality and morbidity particularly in rural Nigeria. Using the gender analytical approach in a cross sectional

dataset, the paper explained how gender relations, poverty and other socio-cultural factors relate to maternal mortality and the possible effects of this relationship on food security and well-being in the household. The study found that lifetime denials, subordination, marginalization and poverty results in ill health or emergency health complications in pregnancy and child birth. The paper argued that socio-economic and cultural factors and indeed gender discrimination contribute to high maternal mortality and morbidity in rural Nigeria.

Worralll, Basu and Hanson (2005) reviewed the link between malaria and poverty in a cross section of African countries using data available on the socioeconomic distribution of malaria incidence and vulnerability. Results of the ordinary least squares regression showed mixed evidence on malaria incidence, with a number of result output identifying no relationship between socioeconomic status and incidence, although a larger number of them do find a link.

In a related study, Worrall, Basu, and Hanson (2003) investigated the relationship between socioeconomic status and malaria in Nigeria. The study adopted a descriptive and qualitative approach in the analyses. The study found that malaria burden is heavier on the poor than on the rich as individuals with mean incomes below US$1/day were less likely to perceive malaria as a preventable disease, more likely to report having fever presently and suffered significant bouts of malaria per month compared to individuals earning greater than US$1/day.

The reviewed empirical literature showed that most studies that examined the effect of malaria on maternal mortality used basically primary data with the micro level analyses conducted. Also some of the studies investigated the impact of malaria and poverty separately on maternal mortality and none tried to investigate the link between malaria and poverty even at the micro level. This study departs from other empirical studies reviewed as it examines the impact of malaria on maternal mortality in Nigeria using relevant secondary time series data. Obtained data are at the aggregate level hence the study is a macro based research different from reviewed studies. More so, poverty is considered in the same model together with malaria to assess their effects on maternal mortality. This study will go further to examine the link between malaria and poverty in Nigeria. Robust econometric techniques discussed in the next section are adopted for the analyses in line with objectives of this study.

Methodology

Theoretical Framework

The framework adopted for this study is the Miasma Theory of Illness. In miasma theory, diseases were caused by the presence in the air of a miasma, a poisonous vapor in which suspended particles of decaying matter that was characterized by its foul smell. The theory originated in the Middle Ages and endured that a killer disease like malaria is so named - from the Italian *mala* ‘bad’ and *aria* ‘air’ - is evidence of its suspected miasmic origins. In 19th-century England the miasma theory made sense to the sanitary reformers. Rapid industrialization and urbanization had created many poor, filthy and foul-smelling city neighborhoods that tended to be the focal points of disease and epidemics. By improving the housing, sanitation and general cleanliness of these existing areas, levels of disease were seen to fall, an observation that lent weight to the theory.

The theory thereby established a link between diseases and health of people. Obviously diseases impact negatively on human health as the incidence of any disease or infection left untreated would cause an individual’s health to degenerate which could lead to death. Therefore, the level of health a person enjoys depend on the existence or otherwise of an infectious disease. In relation to the present study, health outcome such as maternal mortality is determined by the presence of an infectious disease like malaria which is common among pregnant women. This theory serves as a fundamental framework on which our model is formed.

Empirical Model

Drawing from the above theoretical foundation and frameworks used by Nwanosike et al (2015) and Mojekwu and Ibekwe (2012) in their studies, the empirical model for this study, slightly modified, is presented in functional form as:

$$MMR=f(MAL,POV) \quad \ldots\ldots\ldots\ldots (1)$$

Adding some control variables in line with extant literature to Equation 1, we have

$$MMR=f(MAL, POV, EDU, LITR, SAN, GHE) \quad \ldots\ldots\ldots\ldots (2)$$

Equation 2 is represented in econometric form as:

$$MMR_t= a_0 + a_1MAL_t + a_2POV_t + a_3EDU_t + a_4LITR + a_5SAN_t + a_6GHE_t + u_t \quad \ldots\ldots\ldots\ldots (3)$$

Where:
MMR = Maternal Mortality Rate
MAL = Malaria Incidence
POV = Poverty Level
EDU = Education of Females

LITR = Literacy Rate
SAN = Improved Sanitary Conditions
GHE = Government Health Expenditures
U = Error Term
t = Time Period

The a_is are the parameters to be estimated and a priori expectations require that a_1 and a_2 be greater than zero while a_3, a_4 and a_5 be less than zero. The influence of malaria and poverty should be positively related to maternal mortality rate since increases in these variables has adverse effect on a woman's health. A deterioration of the woman's health increases rate of morbidity and mortality, hence the positive relationship among the variables. We also expect a negative link between female education and good sanitary conditions on maternal mortality rate. According to economic theory which posits that education of females help them to acquire skills and knowledge that would increase their wage income which will improve their socio-economic status. This rise in literacy rate and their living standard also enhances their health status and reduces the chances of falling ill or even death. More so, living in a clean sanitary environment reduces the chances of being infected by malaria parasites which causes the disease and a healthier living condition is savored, hence the negative relationship between the variables. Government health activities is also negatively related to maternal mortality rate as government supports and promotes activities in the health sector, general health outcomes are enhanced which includes reduction in the morbidity and mortality rates in the society.

The error correction representation of Equation 3 is given below as:

$$\Delta MMR_t = b_0 + b_1\Delta MALt + b_2\Delta POV_t + b_3\Delta EDU_t + b_4\Delta LITR + b_5\Delta SAN_t + b_6\Delta GHEt + \beta ECM_{t-1} + \varepsilon_t \quad \ldots\ldots(4)$$

Where:
Δ = Difference Operator
ECM_{t-1} = One-period Lag of the Error Correction Term
β = Adjustment Coefficient
ε = Stochastic Disturbance Term

All other variables remain as earlier defined. A priori expectations of the coefficients b_is are same as those of the a_is but the adjustment coefficient, β, should be negative. Equations 4 are estimated in assessment of the first two research questions of the paper. The ECM is appealing because of its ability to induce flexibility by combining the short-run dynamics and long-run equilibrium model in a unified system while at the same time ensuring theoretic rigour and data coherence and consistency (Ekanem, Iyoha and Kanwanye; 2015).

To evaluate the last research question stated for the study, Equations 5 and 6 below are estimated concurrently:

$$MAL_t = \sum_{i=1}^{p} MAL_{t-i} + \sum_{i=1}^{p} POV_{t-i} + u_{1t} \quad \ldots\ldots(5)$$

$$POV_t = \sum_{i=1}^{p} MAL_{t-i} + \sum_{i=1}^{p} POV_{t-i} + u_{2t} \quad \ldots\ldots(6)$$

The Equations 5 and 6 are stated in a Granger causality framework to ascertain the direction of causation between malaria and poverty in Nigeria. The lag length is indicated by rho, ρ.

Estimation and Data

The ECM and Granger causality models specified in the previous section are estimated using the Ordinary Least Squares (OLS) regression approach. This approach (OLS) is adopted due to its best linear unbiased and efficient properties when compared with other linear unbiased estimators. The stationary properties of the variables are, however, conducted using the Augmented Dickey-Fuller (1979) unit root test whiles the Engle and Granger (1987) cointegration test is performed, before the estimations proper. Post-estimation analyses were also performed to evaluate the validity of the results for policy relevance.

In this study, efforts were made to systematically examine the impact of malaria on maternal mortality rate in Nigeria using time series data spanning from 1990 through 2017.The dataset used for this study was obtained from different sources. Specifically, data on MMR, SAN and EDU were sourced from World Bank's World Development Indicators (WDI; 2017), MAL, POV and LITR were obtained from National Bureau of Statistics (NBS; 2017) and GHE from the Central Bank of Nigeria (CBN) 2017 statistical bulletin. The study period was chosen based on availability of data for these variables. Annual total number of malaria cases in the country was used to capture malaria while poverty headcount ratio at \$1.50 a day 2011 purchasing power parity percent of population was the measure of poverty used. Education of female was measured using female secondary school enrollment percent of gross while good sanitary condition was captured by percent of population with access to improved sanitation facilities. Lastly, government health activities were measured

by annual total government expenditure on health in the country.

Results and Discussion

Table 1: Result of Unit Root Test at Levels

Variables	ADF statistic	5% Critical Value	Order of Integration	Remark
MMR	-0.8955	-3.603202	I(1)	N.S
MALD	-1.9264	-2.986225	I(1)	N.S
POV	-0.9705	-2.986225	I(1)	N.S
EDU	-2.5602	-3.612199	I(1)	N.S
LITR	-3.1732	-3.603202	I(1)	N.S
GHE	-1.6805	-2.991878	I(1)	N.S
SAN	-0.6313	-3.612199	I(1)	N.S

Note: N.S= Non- Stationary.
Source: Authors' Computation (2017) using E-views 7

Table 1 presents the unit root results at levels. It shows that all the variables had ADF statistics less than their corresponding 5 percent critical values, in absolute terms. We do not reject the null hypothesis of unit root. Thus, the variables are non-stationary at levels. Extant literature show the dangers of running a regression on non-stationary data of which we know would lead to a spurious and nonsense regression result (Granger &Newbold 1974; Iyoha 2004), and therefore, the need to difference the variables.

Table 2: Result of Unit Root Test at First Difference.

Variables	ADF stat	5% Critical Value	Order of Integration	Remark
DMMR	-4.2594	-3.6122	I(0)	S
DMALD	-4.2883	-2.9919	I(0)	S
DPOV	-5.1641	-2.9919	I(0)	S
DEDU	-3.869	-3.6122	I(0)	S
DLITR	-7.0796	-3.622	I(0)	S
DGHE	-9.1343	-2.9919	I(0)	S
DSAN	-9.6685	-3.6122	I(0)	S

Note: S= Stationary.
Source: Authors' Computation (2017) using Eviews 7**.**

After differencing all the variables once and testing for unit root, all the ADF statistics became greater than their corresponding 5 percent critical values, in absolute terms (Table 2). This suggests that all the variables were stationary after first difference. Hence, all the variables are integrated o order one, I(1).

Table 3: Result of Cointegration Test.

Variables	ADF Statistics	5% Critical value	Order of Integration	Remarks
Residual	-3.6605	-2.9862	I(0)	Stationary

Source: Authors' Computation (2017) using E-Views 7.

Following the two-step approach proposed by Engle and Granger (1987), Table 3 shows the result of unit root test of the residual series obtained from estimating the specified model at levels. The result indicates that there is a long run or cointegrating relationship among the variables, since the ADF statistic is higher than its 5 percent critical value, in absolute terms, implying that the residual series is stationary at levels.

Table 4: ECM result of the impact of malaria on maternal mortality rate.

Variables	Coefficients	Std. Error	t-statistics	Prob.
C	-268.791	424.191	-0.633655	0.5339
DMALD	0.009862***	0.00282	3.499899	0.0024
DPOV	2.168666**	0.86493	2.507335	0.0214
DEDU	-7.593231***	2.05305	-3.698515	0.0015
DLITR	-0.69023	1.93347	-0.356987	0.725
DGHE	-3.027363*	1.73411	-1.745773	0.097
DSAN	46.38920***	9.00617	5.150825	0.0001
ECM(-1)	-0.47514**	0.17888	-2.656217	0.0223
R- squared 0.984113				
Adjusted R-squared 0.979096				
F-statistic 196.1548***				
Prob.(F-statistic)0.000000				
Durbin-Watson stat 1.571018				

Note: ***, ** and *indicate significance at 1%, 5 % and 10% level respectively.
Source: Authors' Computation (2017) using E-Views 7.

Table 4 provides the estimated ECM result. The coefficient of determination and its adjusted counterpart show that the model has a high goodness of fit and predictive ability. Specifically, the coefficient of determination (R-squared) of 0.9841 indicates that about 98% of the systematic variation in the MMR is accounted for by the independent variables. The F-statistic (196.15) was significant at the 1 percent level implying that a significant relation exists between MMR and the independent variables put together. The Durbin-Watson value (1.57) suggests that there is no treat of serial correlation in the model. A significant negative coefficient of a period lag of the ECM term (-0.4751) means that about 47.51 percent of the deviations of the model from its equilibrium value in the previous period are corrected in the current period.

The estimated results showed that malaria and poverty significantly promote maternal mortality rate in the country because they are positively related to it. Poverty rate however had more impact on maternal mortality rate than malaria. The result also revealed that the literacy rate and the proportion of educated female adults reduce the rate of maternal mortality in Nigeria with proportion of educated female adults exerting a significant effect compared with the former. The result also revealed that government health activities suppressed maternal mortality rate due to a significant negative relationship that existed between them. The proportion of the population with access to improved sanitation significantly hinders maternal mortality rate in the country.

Table 5: Granger Causality Result.

Null Hypotheses	Lags	F-Statistic	Prob.
POV does not Granger Cause MALD	1	0.01871	0.8924
MALD does not Granger Cause POV	1	1.36988	0.2544
POV does not Granger Cause MALD	2	0.16790	0.8467
MALD does not Granger Cause POV	2	0.55058	0.5855
POV does not Granger Cause MALD	3	0.20554	0.8911
MALD does not Granger Cause POV	3	0.28554	0.8351
POV does not Granger Cause MALD	4	0.41862	0.7924
MALD does not Granger Cause POV	4	0.16264	0.9536
POV does not Granger Cause MALD	5	0.35691	0.8665
MALD does not Granger Cause POV	5	0.16279	0.9707

Source: Authors' Computation (2017) using E- Views 7.

Table 5 displays the Granegr causality result. It shows that there is no directional relationship or causality between malaria and poverty in Nigeria. Which implies that malaria does not necessarily lead to poverty and the converse also holds?

Conclusion and Recommendations

The main objective of this study is to empirically examine the impact of malaria on maternal mortality rate in Nigeria using the annual time series data spanning from 1990 to 2017. Evidently, we can conclude based on the empirical findings that malaria is a significant determinant of maternal mortality rate as it supports its growth in the country. Poverty is also another significant determinant of maternal deaths in the country and its impact is higher than that of malaria as a disease on the dependent variable. This study has also revealed that other factors that significantly influence maternal mortality rate in Nigeria are proportion of educated female adults, public sector health activities, and the population's access to improved sanitation; while literacy rate had no significant influence.

Based on the findings,this study recommends that the government and relevant authorities should intensify its implementation of programmes designed to combat malaria disease in all states of the Federation. Furthermore, more distribution of free mosquito-treated nets should be encouraged with particular interest in the rural areas since malaria seems to be the disease of the poor. When doing this, emphasis should be placed on women in these habitations especially the pregnant ones among others who are susceptible to the disease. Private sector organizations should support and compliment government's efforts in alleviating poverty by creating gainful employment for the teeming population. This would help increase their income level and afford them opportunities to demand for healthcare services when need be. The government budgetary allocations to both education and health sectors should be increased for favourable outcomes in these sectors.

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