

Impact of health facilities on malaria control interventions among children under five years of age and pregnant women in Nigeria

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Abstract

Malaria is still one of the biggest public health problems in Nigeria in spite of numerous control interventions against the disease as well as access to and availability of medicines to address it. The children under five years of age and pregnant women are household members that are most at risk of this disease. The study aims to examine the impact of health facilities on malaria control interventions. Secondary data from Nigeria Demographic and Health Survey 2013 was utilized to investigate the impact of type of health facility visited on malaria control interventions. Variables on malaria control interventions such as malaria prevention in pregnancy, antimalarial drugs and rapid diagnostic testing were analysed. Chi square analysis was used to test for association between variables at 0.05 level of significance. The number of dose of Intermittent Preventive Treatment in Pregnancy (IPTp) taken during pregnancy was associated with private hospital/clinic, government health post and government hospital. The type of antimalarial drug used was associated with the type of health facility visited by children under 5 years. Rapid diagnostic tests (RDTs) for children under 5 years of age was associated with government hospital, government health centre, private hospital/clinic, chemist/patient medicine store and other private medical sector. Our study concludes that the type of health facility visited has an impact on malaria control interventions in Nigeria. There is a need for political actors and policy makers to improve the standard of health care facilities across the country in order to engender the provision of adequate health service delivery to the children under 5 years of age and pregnant women.

Keywords: Malaria, Health Care Facilities, Under Five Children, Pregnant Women, Nigeria.

Introduction

The 2015 World Malaria Report by the World Health Organization (WHO) showed that Nigeria still has the largest share of malaria burden in Africa¹ in spite of effort by international organizations over the last fifteen years to reduce the incidence and mortality rate of malaria disease through the design of programs such as Roll Back Malaria (RBM),² Millennium Development Goals (MDGs),³ Global Malaria Action Plan (GMAP)⁴ as well as the newly developed Sustainable Development Goals (SDGs)⁵ and Global Technical Strategy for Malaria 2016-2030⁶.

Malaria remain a major public health problem in Nigeria due to weak health system, high rate of poverty, poor investment in the health of the Nigerian population by governments at all levels and inequitable access to quality health care services. The knowledge, attitude and practices of households also contribute to the prevalence of malaria.

Many households especially children under 5 years of age and pregnant women still do not sleep under insecticide treated bed nets (ITNs) due to factors such as family size, level of education, presence of health facility in the community, gender of household head, place of residence, geo-political zone, knowledge that ITNs prevent malaria, marital status and socio-economic status.⁷⁻¹² A lot of households seek malaria treatment in pharmacy stores and other types of places¹³ rather than public or private health facilities. This may be due to better accessibility and shorter waiting time.¹⁴ Many caregivers and parents do not take their children for diagnostic testing.

Practice Points

- The type of health facility visited has an impact on malaria control interventions for household members such as children under 5 years of age and pregnant women in Nigeria.
- The number of dose of IPTp taken during pregnancy was associated with private hospital/clinic, government health post and government hospital.
- The type of health facility visited by children under 5 years of age was associated with the type of antimalarial drug used.
- Rapid diagnostic testing for children under 5 years of age was associated with government hospital, government health centre, private hospital/clinic, chemist/PMS and other private medical sector.
- There is a need for political actors and policy makers to improve the standard of health care facilities across Nigeria in order to engender the provision of adequate health service delivery to children under 5 years and pregnant women.

Pregnant women have limited access to at least two doses of Intermittent Preventive Treatment in Pregnancy (IPTp) with Sulpadoxine Pyrimethamine (SP)¹⁵ that is supposed to be given monthly based on

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WHO recommendation and under the supervision of a trained health care provider during the second and third trimester.^{16,17}

Malaria is responsible for 60% of outpatient visits to health facilities, 30% of childhood deaths, 25% of deaths in children under one year, and 11% of maternal deaths.¹⁸ However, malaria control interventions such as ITNs, IPTp, ACTs and RDTs have led to over 75% decrease in the incidence of malaria disease between 2000-2015 in African countries such as Algeria, Botswana, Cabo Verde, Eritrea, Namibia, Rwanda, Sao Tome and Principe, South Africa and Swaziland.¹ Furthermore, malaria control interventions have led to 12% decrease in number of malaria cases and 48% decrease in number of malaria deaths in Africa.¹ Among children under five years of age in Africa, malaria control interventions led to 58% decrease in number of malaria deaths and 71% decrease in malaria death rate.¹

Evidence on the cost-effectiveness of malaria control interventions such as ITNs, IRS, IPTp and RDTs in sub-Saharan Africa, Asia and South America show different variation in their outcomes with the median cost of administering IPTp to pregnant women substantially less expensive while RDT diagnosis was found to be cost-effective.¹⁹⁻³⁵ There is no study conducted to the best of our knowledge on the impact of health facilities on malaria control interventions among the most at risk group using a nationally representative household survey in order to inform policy decisions and aid strategies that will specifically address the burden of malaria among under five children and pregnant women.

The Nigerian Demographic and Health Survey¹² provide information that can be used to understand the challenges faced by children under five years of age and pregnant women in Nigeria in terms of health facility coverage and health service delivery. The analysis of data on malaria provided by this household survey would assist policy makers and political actors in adopting a holistic approach towards reducing the burden of malaria among these high risk groups to the point that it is no longer a public health challenge.

The aim of the study is to investigate the impact of health care facilities on malaria control interventions among children under five years of age and pregnant women in Nigeria. Specific objectives of the study were to determine the association between type of health facility visited for antenatal care (ANC) by pregnant women and the number of dose of IPTp received for malaria prevention; to determine the relationship between the type of health facility children under five years of age with fever sought care and type of antimalarial drug used; and to determine the association between type of health facility visited and rapid diagnostic test among children under five years of age with fever who sought care.

Materials and methods

Data source

Secondary data from the 2013 Nigeria Demographic and Health Survey (NDHS)¹² was Utilized for the study. NDHS is a nationally representative cross-sectional study conducted by the National Population Commission (NPC) with funding by United States Agency for International Development (USAID), the

United Kingdom Department for International Development (DFID) through Partnership for Transforming Health Systems Phase II (PATHS2), and the United Nations Population Fund (UNFPA) with technical support from ICF International. The NDHS 2013 provides updated estimates of some of the basic demographic and health indicators covered in the earlier surveys such as fertility levels, marriage, fertility preferences, awareness and use of family planning methods, child feeding practices, nutritional status of women and children, adult and childhood mortality, awareness and attitudes regarding HIV/AIDS, in addition, to information on violence against women.

Study areas

Thirty six states of the federation and the federal capital territory (FCT), Abuja was covered in the survey. A total of 38,700 households were interviewed. The survey used as a sampling frame the list of enumeration areas (EAs) prepared for the 2006 Population Census of the Federal Republic of Nigeria, provided by the National Population Commission. The primary sampling unit (PSU), referred to as a cluster in the NDHS 2013, is defined on the basis of EAs from the 2006 EA census frame. The 2013 NDHS sample was selected using a stratified three-stage cluster design consisting of 904 clusters, 372 in urban areas and 532 in rural areas.

Data collection

Data was collected through interviews conducted by NPC enumerators with household members on a quarterly basis from February 2013 to June 2013. In obtaining the micro data, a request was made on the DHS program website on March 25, 2016 and approval was granted to download the data on March 28, 2016.

Data analysis

Data were analysed using SPSS version 22 software. A significance level of $p < 0.05$ was used.

Results

Descriptive statistics

Table 1 present the socio-demographic characteristics of respondents. The majority of respondents were aged between 25-29 years (27.9%). Among the study population, 46.3% had no education, 31.8% had primary education, 16.8% had secondary education and 5.1% had higher education. Majority of household heads were males (89.4%) while only 10.6% were females. A total (76.0%) of households had more than five members while only 24.0% had households with less than five members. Majority of the population (67.1%) lived in rural area while only 32.9% lived in urban area. Most of the respondents (98.3%) lacked health insurance while only 1.7% were under health insurance coverage. Respondents consisted of households and individuals from the six geo-political zones: North Central (14.7%), North East (20.7%), North West (31.5%), South East (8.9%), South South (11.9%) and South West (12.3%).

Association between health facility visited and doses of IPTp

The number of dose of IPTp with SP taken by pregnant women during pregnancy was significantly associated with private hospital/clinic ($p=0.000$), government health post ($p=0.000$) and government hospitals ($p=0.020$). Details are given in Table 2.

Table 1: Socio-demographic characteristics of the respondents

Household and Individual Characteristics	Respondents (%) (n = 31482)
<i>Age in 5 years</i>	
15-19	1543 (4.9%)
20-24	6076 (19.3%)
25-29	8783 (27.9%)
30-34	6926 (22.0%)
35-39	4911 (15.6%)
40-44	2330 (7.4%)
45-49	912 (2.9%)
<i>Highest Education</i>	
None	14576 (46.3%)
Primary	10011 (31.8%)
Secondary	5289 (16.8%)
Higher	1606 (5.1%)
<i>Gender of Household Head</i>	
Male	28145 (89.4%)
Female	3337 (10.6%)
<i>Household Size</i>	
Less than 5 members	7556 (24.0%)
More than 5 members	23926 (76.0%)
<i>Location</i>	
Urban	10358 (32.9%)
Rural	21124 (67.1%)
<i>Geo-political Zone</i>	
North Central	4628 (14.7%)
North East	6517 (20.7%)
North West	9917 (31.5%)
South East	2802 (8.9%)
South South	3746 (11.9%)
South West	3872 (12.3%)
<i>Socio-economic Status</i>	
Poorest	7083 (22.5%)
Poorer	7398 (23.5%)
Middle	6265 (19.9%)
Richer	5793 (18.4%)
Richest	4943 (15.7%)
<i>Health Insurance Coverage</i>	
Lack health insurance	30947 (98.3%)
Under health insurance	535 (1.7%)
<i>Marital Status</i>	
Never Married	598 (1.9%)
Married	29121 (92.5%)
Living with partner	881 (2.8%)
Widowed	379 (1.2%)
Divorced	283 (0.9%)
Separated	220 (0.7%)

Association between health facility visited by children and antimalarial drug used

Table 3 present result of the association between type of health facility visited by children under 5 years of age and type of antimalarial drug used. There was a

statistically significant association between type of health facility visited and type of anti-malaria drug used.

Association between health facility visited and rapid diagnostic test for children

Rapid diagnostic tests (RDTs) for children under 5 years of age was statistically associated with government hospital ($p=0.000$), government health centre ($p=0.000$), private hospital/clinic ($p=0.000$), chemist/PMS ($p=0.000$) and other private medical sector ($p=0.007$). Details are given in Table 4.

Discussion

According to the Central Intelligence Agency World Fact Sheet 2015 estimates, over 60 per cent of the Nigerian population are under the age of 24 years, 25.92 per cent are between the ages of 25 to 54 years while only 3.11 per cent are 65 years and above. About 30 million people are under five years of age while 42 million females are within the reproductive age. This explains the reason infectious diseases such as malaria is a big problem in Nigeria, though, non-communicable diseases such as cancer, hypertension, stroke, diabetes and cardiovascular diseases are also fast becoming epidemic. Therefore, Nigeria is battling a dual epidemic.

Our study show that the type of health facility visited by children under 5 years and pregnant women have an impact on the survival against malaria cases and deaths, hence, governments and decision makers need to work towards the provision of adequate and well-equipped health care facilities for the benefit of the Nigerian population. The children under 5 years of age and pregnant women are the most at risk group and susceptible to malaria illness.^{36,37} These two groups are often vulnerable and disadvantaged besides they are worst hit by malaria which is a one of the diseases of poverty.³⁸ Approximately one in eight children die before their fifth birthday¹² while malaria contributes to an estimated 11% of maternal mortality in Nigeria.³⁹

Nigeria account for over 20% of both malaria cases and malaria deaths among fifteen countries in sub Saharan Africa that has the highest burden of malaria disease.¹ The National Malaria Strategic Plan 2014-2020 stated that malaria is responsible for 60 per cent of outpatient visits to health facilities.¹⁸ The children under 5 years of age and pregnant women constitute a larger per cent of patients that visit these health facilities and experience barriers to access health care services due to ill-equipped health facilities and infrastructure.^{40,41} Result from our study show that the number of doses of IPTp during pregnancy was

Table 2: Association between types of health facility visited for ANC and number of IPTp taken

Type of facility visited for ANC	Number of dose of SP was taken by the respondents (%)				Chi square	p-value
	1	2	3	> than 3		
Private hospital/clinic	5126 (41.1%)	3867 (31.0%)	2195 (17.6%)	1285 (10.3%)	51.43	$p=0.000$
Government health post	3068 (24.6%)	3131 (25.1%)	5850 (46.9%)	424 (3.4%)	104.57	$p=0.000$
Government health centre	4727 (37.9%)	4665 (37.4%)	2395 (19.2%)	686 (5.5%)	16.79	$p=0.469$
Government hospital	4415 (35.4%)	5090 (40.8%)	2145 (17.2%)	823 (6.6%)	30.93	$p=0.020$
At home	4378 (35.1%)	4378 (35.1%)	2694 (21.6%)	1023 (8.2%)	1.975	$p=1.000$

Table 3: Association between type of facility visited by febrile children and type of antimalarial drugs used

Healthcare facilities visited	Number of febrile children who took antimalarial drugs (%)						
	Sulphadoxine Pyrimethamine	Chloroquine	Amodiaquine	Quinine	ACT	Others	Antibiotic Pills/Syrup
Government hospital	679 (18.7%)*	585 (16.1%)*	80 (2.2%)	15 (0.4%)	356 (9.8%)*	341 (9.4%)*	1271 (35.0%)*
Govt. health centre	400 (11.0%)*	668 (18.4%)*	94 (2.6%)*	62 (1.7%)*	316 (8.7%)*	283 (7.8%)*	1180 (32.5%)*
Mobile clinic	519 (14.3%)	0	0	0	0	0	0
Govt. health post	458 (12.6%)	327 (9.0%)	163 (4.5%)*	0	360 (9.9%)*	262 (7.2%)	1406 (38.7%)
Other public sector	0	0	0	0	0	0	2423 (66.7%)
Private hospital/clinic	588 (16.2%)*	327 (9.0%)	65 (1.8%)	18 (0.5%)	280 (7.7%)	490 (13.5%)*	1406 (38.7%)*
Private pharmacy	559 (15.4%)*	149 (4.1%)	0	29 (0.8%)	294 (8.1%)	592 (16.3%)*	1064 (29.3%)
Private doctor	0	970 (26.7%)*	0	243 (6.7%)*	243 (6.7%)	483 (13.3%)	726 (20.0%)
Chemist/PMS	251 (6.9%)*	341 (9.4%)	47 (1.3%)	22 (0.6%)	167 (4.6%)	262 (7.2%)	1162 (32.0%)*
Other private sector	0	0	0	0	0	330 (9.1%)	-
Traditional practitioner	142 (3.9%)	58 (1.6%)*	0	0	29 (0.8%)*	0	-

Table 4: Association between type of facility visited and rapid diagnostic test for children

Health Facilities where advice was sought	Blood taken by the respondents		Chi square	P-value
	Yes	No		
Government hospital	1155 (31.8%)	403 (11.1%)	127.80	p=0.000
Government health centre	726 (20.0%)	360 (9.9%)	36.20	p=0.000
Mobile clinic	0	7 (0.2%)	0.78	p=0.679
Government health post	130 (3.6%)	98 (2.7%)	1.25	p=0.535
Other public sector	0	4 (0.1%)	0.39	p=0.824
Private hospital/clinic	476 (13.1%)	138 (3.8%)	64.88	p=0.000
Private pharmacy	65 (1.8%)	98 (2.7%)	1.12	p=0.570
Private doctor	11 (0.3%)	15 (0.4%)	0.19	p=0.911
Chemist/PMS	643 (17.7%)	1434 (39.5%)	70.59	p=0.000
Other private sector	36 (1.0%)	7 (0.2%)	9.89	p=0.007
Traditional practitioner	54 (1.5%)	127 (3.5%)	4.24	p=0.120

associated with private hospitals, government health post and government hospital. WHO recommend that at least two doses of IPTp with SP be given to all pregnant women during pregnancy.^{16,17} In this study, between 25% to 41% of pregnant women received two doses of IPTp with SP. Similar studies conducted in South East⁴², South West⁴³⁻⁴⁵, North East⁴⁶ and at the national level in Nigeria⁴⁷ showed that about 37% of pregnant women received two doses of IPTp less than the target of RBM program indicating low adherence and uptake of IPTp for patients who sought care at health facilities. A study conducted in Uganda also show that only about a quarter of pregnant women receive two doses of IPTp with SP.⁴⁸

However, these findings are in contrast with studies conducted in Central Mozambique⁴⁹, Dar es Salaam⁵⁰ and Uganda⁵¹ where the uptake level for IPTp ranged between 52% to 92%. Poor uptake or adherence to IPTp

could be responsible for the prevalence rate of malaria in pregnancy across Nigeria ranging between 19.7% to 72%.⁵²⁻⁵⁵ Furthermore, malaria is responsible for 30% hospitalization among children under five years of age in Nigeria.⁵⁶ WHO also recommend Artemisinin-Based Combination Therapies (ACTs) as the drug of choice due to its safety and tolerability in young children. Nigeria adopted ACTs as the first line treatment for uncomplicated malaria in 2005. Our study found that the type of antimalarial drug used was associated with seeking advice/treatment at government hospital and government health centre. In this study, between 0.8% to 9.9% of febrile under 5 children who visited health facilities used ACTs. Studies conducted on the use of ACTs among under five children in Osun State⁵⁷ and Ekiti State⁵⁸ in Nigeria found that less than 10% of children

under five years of age utilised ACTs. Prompt diagnostic testing for children under 5 years of age before treatment and without delaying treatment is recommended by WHO. Our study found that the diagnostic testing for children under 5 years of age was associated with seeking advice/treatment at government hospital, government health centre, private hospital/clinic, chemist/PMS and other private medical sector. Furthermore, mainly government health facilities are doing well but even then only 20% to 32% of children under 5 years of age is being tested for blood. However, only 0.3% to 18% of children under 5 years of age are being tested for blood in private health facilities. This is supported by a study in Benin, the Democratic Republic of Congo (DRC), Madagascar, Nigeria, Uganda and Zambia where only 2% to 16% of febrile children under five years of age received a malaria blood test in private health facilities prior to treatment.⁵⁹ Most children under 5 years of age and pregnant women in Nigeria often have a poor economy that constraint them from seeking the best medical care. This group constitute a larger percentage of the Nigerian population and are prone to infectious diseases.^{19,20} Though there are numerous programs and interventions at both the state and national levels but the malaria situation in Nigeria does not seem to be changing for the better. There is a need to evaluate the effect of the different malaria control interventions to determine factors responsible for the slow decline recorded over the decade in fighting malaria disease. This will assist decision makers and governments in rethinking their strategies and improving malaria control intervention towards elimination of the disease.

Limitations

Our study has some limitations but this does not invalidate our work. The 2013 NDHS dataset used in the study is affected by the structure of the questionnaire, mode of data collection, recall bias as well as issues of validity, reliability and comparability.

Conclusion

Our study concludes that health care facilities have an impact on malaria control interventions for children under five years of age and pregnant women in Nigeria. Findings from the study showed that there is low uptake of malaria control interventions such as IPTp, ACTs and RDTs among pregnant women and children under 5 years of age. This implies that health care facilities are ill-equipped to address the high burden of malaria in Nigeria.

Governments should pay attention to the challenges of availability of and accessibility to well-equipped health care facilities for these high risk groups in order to improve their health status and reduce the high mortality rate that is consistently recorded among these groups. Addressing the burden of malaria among children under five years and pregnant women through the availability of and accessibility to well-equipped health facilities will tremendously improve health indicators such as under five mortality, infant mortality and maternal mortality. Policy makers and political actors across Nigeria should show strong commitment to the plight of children and pregnant women and improve access to health delivery services through the provision of well-equipped physical infrastructure within the specified

standard. In addition, governments should ensure the availability of drugs in health care facilities as well as the monitoring and training of health care workers on the national treatment guidelines.

Competing interest

The authors declare that they have no competing interests.

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