

**ASSESSMENT OF METHODS OF PREVENTION OF MALARIA AMONG
UNDER- FIVE CAREGIVERS IN MILGOMA, A RURAL SETTING
IN KADUNA STATE NORTH-CENTRAL NIGERIA**

**AUDU ONYEMOCHO¹, JOSHUA ISTIFANUS ANEKOSON² OGBEYI GODWIN OFIKWU³,
ANEJO-OKOPI JOSEPH⁴ & ANEFU OKPOTU GABRIEL⁵**

^{1,3}*Department of Epidemiology and Community Health, College of Health Sciences,
Benue State University, Makurdi, Benue State, Nigeria*

²*Department of Community Medicine, Kaduna State University, Kaduna, Nigeria*

⁴*Department of Microbiology, University of Jos, Nigeria*

⁵*Department of Public Health, Benue State Ministry of Health, Makurdi, Benue State, Nigeria*

ABSTRACT

Background

Nigeria government in her strategy to fight the scourge of malaria in the country adopted the Roll Back Malaria initiative in 1998. Since inception, the country has been working towards the vision of having a malaria free nation. Despite the interventions, Nigeria still carries the greatest malaria burden among countries in the world. This study assessed the methods of prevention of malaria amongst the under-five care givers in Milgoma, a rural setting in Kaduna state, north-central, Nigeria.

Methods

A cross sectional descriptive study was conducted amongst 148 under-five care-givers between 6th and 20th April, 2014 using a two stage systematic random sampling technique. Structured interviewer administered questionnaire were used for data collection. Analysis of the data collected was done with statistical package for social sciences version 20.0.

Results

The knowledge of methods of transmission and the prevalence of the disease among the respondents was high (85.9% and 83.8% respectively). Amongst those who had experienced malaria 46.2% sought for treatment in hospitals within the first 24-48 hours while the rest sought for treatment in chemist (16.1%) or traditional medicine (13.7%) and 2.4% did not sought for any treatment. Ninety-nine (66.9%) uses insecticide treated nets while 60.8% uses pyrethamine and sulfadoxine in pregnancy.

Conclusions

For Nigeria to achieve the goal as a malaria free nation; there is need to intensify the provision of tailored malaria prevention information, education and communication to the care givers of under five children to maximize utilization of the mainstream intervention programmes provided by the government.

KEYWORDS: *Malaria, Prevention, Under-Fives, Care-Givers, Rural Setting, Nigeria*

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INTRODUCTION

In the last two decades, the prevalence of malaria has been reported to be escalating at an alarming rate making it to ranked third among major infectious disease threats in Africa after pneumococcal acute respiratory infections (3.5%) and tuberculosis (2.8%) [WHO,1998]. In Nigeria, the disease remains the most common cause of outpatient attendance across all age groups over the years; with the most prevalent being children below five years and the pregnant women. An estimated 11% of the maternal mortality is related to malaria in pregnancy and it also accounts for about 25% of infant mortality and 30% of childhood mortality [US, 2010]. Over 80% of reported cases of the disease in Nigeria are treated with out of pocket expenses in patent medicine vendors, private health facilities and local herbs homes [Abisoye, Babatunde & Oluwakemi, 2014; Falade, Oladoyinbo & Oduola, 2006]. In addition to the morbidity and mortality due to the disease, it also constitutes a major economic burden on Nigeria as a country [US, 2010; Falade, Oladoyinbo & Oduola, 2006; Johnbull, et.al 2014]. About N486 billion is lost to malaria annually in the form of treatment cost, prevention, loss of work time, and high rate of absenteeism among school children in Nigeria [Charlotte and Rebecca, 1993].This reduction of human work capacity and productivity adversely affects the socio-economic development of the country [Charlotte & Rebecca, 1993; Jimoh, 2003; Ajayi et.al 2008].

The Federal government of Nigeria as a strategy to fight the scourge of malaria in the country adopted the Roll back malaria initiative (a global initiative on malaria control) in 1998. Since inception, the country has been working towards the vision of having a malaria free nation. In that regard, the country has mainstream her intervention programmes with the goal to achieving 50% reduction of malaria related morbidity and mortality in 2013 and scale up to 80% by 2015[FMOH, 2004].The key operational areas in the plan include: Prevention of malaria transmission through integrated vector management (IVM) strategy, scale up of long lasting insecticide treated nets (LLIN), prompt diagnosis /treatment and prevention of malaria in pregnancy, changing of behavioral and social norms with respect to sleeping inside LLINs and prompt diagnosis, and treatment of malaria in general population [WHO, CDC & RBM, 2000; Oresanya, Hoshen&Sofola, 2008].

Most states of the federation adopted the national malaria prevention and control plan, with the establishment of malaria control units both at the state and local government levels. In the states where the intervention programmes were instituted, LLNs were distributed free of charge to people at risk of malaria in accordance with the recommendation of the World Health Organization (WHO) [Hmwe et. al, 2014]. Rapid malaria diagnostic kits and artemisinin based combination therapy drugs are also supplied at subsidized rate for prompt diagnosis and treatment for general population. Despite these interventions, Nigeria still carries the greatest malaria burden among countries in the world [WHO, 1998; Hmwe et. al, 2014].This study assessed the methods of prevention of malaria amongst the under-five care givers in Milgoma, a rural setting in Kaduna state, north-central, Nigeria.

MATERIALS AND METHODS

Study Area

Milgoma is a settlement under Bomo Ward, Sabon-Gari Local Government Area of Kaduna State, Nigeria. The settlement was named “Mil-Goma” based on the fact that it was said to be ten miles from Zaria City, the dwelling place of the Emir of Zazzau (a very prominent town in Kaduna State Nigeria). It shares boundary with Ahmadu Bello University Teaching Hospital (ABUTH) and Shika-Village to the north, Institute of Agricultural Research Farms to the west, Ahmadu Bello University, Zaria to the South and Kurmi and Arewaji villages to the East. The report of census conducted by the 600

level students of ABU Zaria on community diagnosis posting shows that the settlement has an estimated population of 3939 with approximately 306 households. The children below five years were about 125 while the women of the reproductive age were 856 (unpublished).. The dominant inhabitants are Hausas, who are farmers, traders and civil servants. Mil-Goma is about 686 meters above sea level within Latitude 11^o 4¹N and Longitude 7^o44¹E. It has mean annual rainfall of 1100 millimeters and temperature of 26^oC in January to 39^oC in April. The humid climate and the distribution of rains almost all year round allow the breeding of mosquitoes throughout the year. The settlement is supplied with electricity as its primary source of power. Their major source of water supply is from wells which are usually left uncovered but there was pipe-borne water which became non-functional ten years prior to the study. The main source of health care by the inhabitants is a Primary Health Center (PHC) in Bomo village which is about 3Km away from Milgoma and ABUTH about 150m away. Occasionally, health talks on malaria are delivered at the PHC by the health workers and Long Lasting Insecticide Treated Nets (LLITNs) are also distributed free of charge to antenatal services attendees. Same services are also rendered to under-five care mothers/care givers who visit the PHC child welfare clinics with their under-five children. There is a private and government owned primary school and a public secondary school in the settlement. The main method of sewage disposal is via pit latrine while that of refuse disposal is by open dumping and burning. The housing type is mainly that of a slum characterized by mud houses, all essentially without door and window nettings. A large portion of the village has improper drainage systems filled with stagnant, non-flowing water. Milgoma is selected for this study because of the environmental factors of the settlement which facilitate spread of malaria. Furthermore, the village is accessible to good health facility; hence it is assumed that those who may manifest with malaria symptoms should have prompt diagnosis and treatment.

Study Design and Study Population

A cross sectional descriptive study design was used for the study. The study population was women of the reproductive age group. In this case 15 -45 years was chosen as the reproductive age. Eligibility was based on antenatal care or care of under-five children a year prior to the survey. Women who have never had an antenatal care a year prior to the study and or never taken care of an under-five child within a year prior to the survey were excluded from the study. Eligible respondents who did not consent to the study were also excluded.

Sample Size Estimation and Sampling Technique

With assumption of 90% of global malaria prevalence in Africa [Thomas, 1998] an error margin of 5% and a power of 95%, a sample size of 132.7 was arrived at using the formula [Singa, 2002]

$$\left(\frac{n = \frac{Z^2 P_0 q_0 / d^2}{1 + (Z^2 P_c q_c / N d^2)}} \right) \text{ [Singa, 2002]}$$

Taking into account a drop-out rate of 10%, the calculated sample size was adjusted to 148. The sampling procedure was two staged sampling aimed at selecting eligible persons with known probability. Stage one was selection of eligible households within the village. Stage 2 was the selection of actual respondents within the households. This was done by systematic random technique. A household is defined as people eating from a common pot. A compound may include many households. In households with more than one eligible respondent, one was selected by toss of coin. Mapping of the village was done and the list of all the households was used as the sampling frame. The sampling interval

was calculated and the selection of household was carried out based on the sampling interval.

Data Collection

The study was conducted between 6th and 20th April, 2014. Consecutive eligible respondents seen over the study period were solicited to participate. Consenting subjects were counselled and their informed consent was duly obtained. Their socio-demographic characteristics (age, education, and occupation, ethnicity), history of malaria in the last 12 months before survey, drugs taken for treatment of fever in adults/children, use of bed nets, uptake of Intermittent Preventive Treatment of malaria in pregnancy (IPTp); were obtained by structured interviewer administered questionnaire.

Statistical Analysis

A descriptive analysis was performed on each variable with the aid of Statistical Package for Social Sciences (SPSS) software and presented as tables and charts.

Ethical Considerations

Ethical approval for the study was obtained from the research ethic committee of ABUTH, Kaduna, Nigeria before the commencement of the study. Informed consent was as well sought from the household heads. Participation of the study population was voluntary and all the respondents who consented to participate in the study signed an informed consent. The purpose of the study was explained at the time of the interview and the respondent's confidentiality was assured.

RESULTS

Socio-Demographic Data

The predominant occupation of the respondents was farming (33.8%), followed by petty trading (25.7%), civil servant (16.9%) and food selling (12.2%). Full housewife constitutes 9.5%. Majority (38.5%) of the respondents attended Quranic schools. Amongst the respondents who had western education, those with had post-secondary school (tertiary school) qualification constitutes the highest (24.3%), followed by those that had first school leaving school certificates (20.9%). Respondents who had only secondary education and those who never attended any form of school were the least (15.5% and 0.7% respectively). The respondents were predominantly Hausa (67.6%) and more than half (69.6%) of them were married (Table 1).

Respondent's Perceived Causes of Malaria

Of the caregivers who were interviewed, 128 (85.9%) knew that malaria is transmitted via mosquito bite, followed by drinking of dirty water (47.9%), exposure to bad weather (36.5%), bad water (32.4%), inadequate food intake (26.4%), bad weather (24.3%), bushy surrounding (6.8%) and gods will (6.1%). Other perceived causes of malaria opined by the respondents were exposure to sun light, infections of other causes and dirtiness (4.7%) (Figure 1).

Table 1: Socio-Demographic Characteristics of the Respondents (n=148)

Variable	Frequency	Percent
Age Group (Year)		
15-19	33	22.3
20-24	30	20.3
25-29	19	12.8
30-34	111	75.0

Table 1: Contd.,		
35-39	21	14.2
40-44	8	5.4
45-49	37	25.0
Educational Qualification		
Quranic school	57	38.5
Primary school	31	20.9
Secondary school	23	15.5
Tertiary school	36	24.3
None	1	0.7
Marital Status		
Single	41	27.7
Married	103	69.6
Divorced	1	0.7
Widowed	3	2.0
Ethnicity		
Hausa	100	67.6
Igbo	8	5.4
Yoruba	13	8.8
Others	27	18.2
Religion		
Islam	128	86.5
Christianity	19	12.8
Others	1	0.7
Occupation		
Farmer	50	33.7
Petty trader	38	25.7
Civil servant	25	16.9
Food seller	18	12.2
Housewife	14	9.5
Others	3	2.0

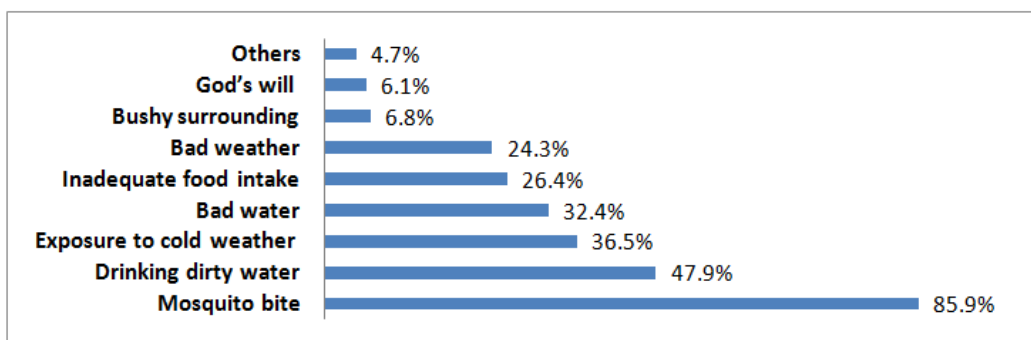


Figure 1: Respondents Perceived Causes of Malaria

Others: Exposure to Sunlight, Infection and Dirtiness

History of Malaria and Treatment in the Last 12 Months before Survey

Table 2 represents the summary of events surrounding malaria episode experienced by caregivers or their under-five children 12 months before the survey. Above two-third (83.8%) of respondents had experienced at least an episode of malaria either by the respondents themselves (under-five care givers) or their children (under 5-years). Majority (53.2%) of those affected were children bellow 5 years of age, followed by the care givers (37.1%). Eighty-two (66.1%) of the respondent that had experienced malaria seek treatment in primary health care or tertiary health facility, 20 (16.1%) seek for treatment in chemist, 17 (13.7%) sought for traditional medicine (herbs), while 3(2.4%) ignored the sickness and

2(1.6%) sought for prayers. All the patients who were treated in the hospital had rapid malaria test investigation. Twenty-nine (24.4%) of respondents seek intervention within 24 hours of onset of illness, 46.2% seek intervention between 24-48 hours and 29.4% seek intervention after 48 hours.

Table 2: Summary of History of Malaria among Respondents in Last one Year Prior to Study

Had Malaria (n=148)	Frequency	Percent
Yes	124	83.8
No	24	16.2
Household Member Affected (n=124)		
Under-five	66	53.2
Self (WRAG)	46	37.1
Both WRAG and Under-five	12	9.7
Treatment Sought for (n=124)		
Health facility (PHC/ABUTH)	82	66.1
Chemists	20	16.1
Herbs	17	13.7
Ignore	3	2.4
Prayer	2	1.6
Time Interval between Illness and Intervention (Health Facility) n=119		
<24hours	29	24.4
24-48hours	55	46.2
>48hours	35	29.4

Primary Malaria Prevention Methods used by Respondents

The predominated method of prevention of malaria practiced by the respondents was use of insecticide treated nets (66.9%), followed by mosquito coil (43.2%), indoor insecticides spray (39.2%), and good drainage (35.1%), windows/door nets (21.6%), bush clearing (19.6%) and use of repellants constitutes the least (4.7%). Ninety (60.8%) of the respondents who attended antenatal clinics a month before the survey had combination of Sulphadoxine-Pyrimethamine from the health facilities visited.

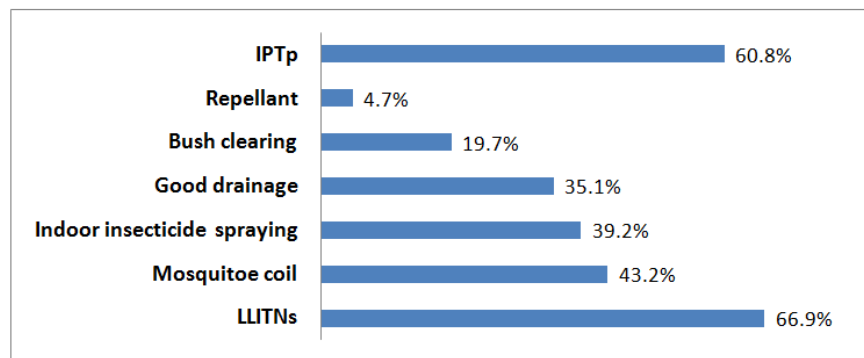


Figure 2: Distribution of Respondents by Malaria Preventive Methods used in Last 12 Months before Survey

Key: IPTp = Intermittent Preventive Treatment of Malaria in pregnancy; ITNs= Insecticide Treated Nets.

DISCUSSIONS

The results of this study indicate that the awareness of malaria among caregivers of under-five children in rural Maigoma was high, as 85.9% of them knew that malaria is transmitted via mosquitoes bite (Table 1). This finding is lower

than 92.3% reported in a similar study in Makurdi, north central Nigeria [Bako, Pennap&Nwadioha, 2013], but higher than 65% reported for South West Nigeria [Oreagba, et.al, 2004]. The awareness of mosquitoes bite as the main mode of transmission of malaria reported in this study is an initial step in the control of the disease; however, the misconceptions reported (Figure 1) is a concern since that can affect the overall practice of the prevention protocols. Amongst the misconceptions reported in our study, drinking of dirty water (47.9%) constitutes the highest, followed by exposure to bad weather (36.5%), bad water (32.4%), inadequate food intake (26.4%), bad weather (24.3%), gods will (6.1%), exposure to sun light and dirtiness (4.7%). However, the misconception demonstrated by the respondents in our study are consistent with the report of a study conducted in Kenya where significant proportion of under-five mothers interviewed attributed malaria to dirt, dirty foods/utensils, unboiled water, uncooked food and dirty compounds [Osero, Otieno&Orago, 2006].

From the socio-demographic findings in our study where only 1(0.7%) of our respondents were of the illiterate educational status, a high proportion of the respondents were expected to demonstrate excellent knowledge of understanding of the cause of malaria; whereas it was not so. The gap in the knowledge could have resulted from inadequate access to appropriate knowledge on malaria. On the other hand, since 60.8% of the antenatal attendees were given antimalarial prophylaxis (IPTp) (Figure 2), the misconception could be probably due to the mode of communication by the health workers in the health facilities who attend to the mothers. By implication, if adequate information is not passed especially in areas of proper usage and maintenance of LLITNs the prevalence of malaria will continue to be on the increase since the geographic/atmospheric condition of the study area promotes mosquito breeding.

With regard to cases of malaria episodes witnessed by the under-five care givers, this study has demonstrated a high prevalence (83.8%) among mothers and under five children in the one year prior to the study. Majority of the cases were seen among the under-fives (Table 2). The prevalence of malaria in this our study is far below the 91.0% estimated for the African Region [Hmwe, et.al, 2014] and 86.0% for children under 5 years of age, but consistent with the national report [US, 2010]. The high prevalence of malaria amongst the rural dwellers in our study can be explained from the fact that they are more exposed to mosquito bites, due to thick vegetation and poorer drainage systems which encourage mosquito breeding in stagnant water around their homes. Furthermore, only 52(35.1%) of the respondents admitted to practicing good drainage (Figure 2). By implication, the national target to achieving 50% reduction of malaria related morbidity and mortality in 2013 has not been completely attained in the study area, hence an option is scale up the intervention programmes.

In this study, the caregivers knew and practice several methods of preventing malaria in the community. Amongst these, consistent use of insecticide treated net which has been proven to be more cost effective and more sustainable is practiced by slightly above two-third (66.9%) of the under-five caregivers in in our study. This may be due to the free distribution of insecticide treated nets under the malaria control programme in the country [Hmwe, et.al, 2014]. With the scale up phase of free LLINs distribution in 2009-2010 in Nigeria in which Kaduna state where the study area is found, this is commendable, although the coverage is still below the targeted national coverage of at least 80% [WHO/CDC/RBM, 2000]. The finding in our study is consistent with low ownership and usage of LLINs by household member reported for Sub-Sharan Africa in 2013 [WHO, 2013]. A similar study conducted in urban areas of Lagos Nigeria reported LLINs usage of 61.8% amongst the sampled respondents [Okafor and Odeyemi, 2012]. However, the finding in our study is above 59.4% reported for caregivers in Makurdi, an urban resident in north central Nigeria [Bako, Pennap&Nwadioha, 2013]. A similar report was observed in Kenya where only 59.0% of under-five caregivers use LLITNs [Sophia, et.al, 2010]. The

gap between the coverage in our study and the national target of 80.0% could be due to noncompliance to consistent use of LLINs [WB, 2013]. Other integrated environmental methods of prevention practiced by the respondents as demonstrated in our study if strengthened can be used as good opportunity for achieving the national target. Concerted efforts therefore has to be made on the education of caregivers and the general populace about the other malaria preventive methods as recommend by WHO [Hmwe, et. al, 2014].

Health seeking behaviour is an integral component of achieving a malaria free nation. In our study 24.4% of under-five givers sought for intervention within the first 24 hours of onset of malaria illness, while 46.2% seek intervention between 24-48 hours and 29.4% seek intervention after 48 hours and significant proportion of them seek for interventions from primary, secondary or tertiary health facilities. This is probably due to good geographical access to orthodox facilities and good health seeking behaviour of the rural dwellers in our study area. However, the findings in our study is of variant from the national survey conducted by the Federal Ministry of Health, Abuja Nigeria in 2000 where home management tops the list of the first actions taken during malaria illness in under-fives. It was also found that under-five caregivers visit a variety of sources such as patent medicine vendors, traditional healers, health centres, hospitals, private clinics, drug hawkers and diviners to obtain medications. The finding demonstrated in our study is commended as it forms an integral component of the desired goal of combating malaria [Hmwe, et. al, 2014].

In our study all the patients who were treated in the hospital had rapid malaria test investigation with payment of stipends. Even though the our study could not established the details of the total fees paid for the services (investigation), the compliance of the under-five care givers in our study with the stipulated fees at the health facilities visited is a proof of the exercise been effective, affordable and acceptable. If the artemisinin combined therapy recommended in the WHO guidelines for enhance prompt and appropriate treatment of malaria episodes within 24 hours of onset of illness is given the same approach like the rapid investigation test kits, then the overall goal of Roll back Malaria will be achievable across the nation. This will in another way, limits the incidence of fast-spreading parasite resistance to the common anti-malaria drugs recorded over the last decade. Comparing the 100% compliance of the use of rapid diagnostic kits for the diagnosis of malaria in the hospital and 60.8% use of Sulphadoxine-Pyrimethamine in pregnancy by same respondents in our study, it implies that knowledge passed across to the under-five care givers by the health worker is not adequate, or the mothers do not want the drug due to other reasons. Another possibility could be non- availability of Sulphadoxine-Pyrimethamine in the health facilities during the antenatal visit of the attendees.

CONCLUSIONS

A high proportion of the under-five care giver in our study has demonstrated a good knowledge of the cause of malaria and a substantial proportion them and their children had experienced at least an episode of malaria in the last one year prior to the study. Majority of them sought for orthodox medical treatment within the first 24-48 hours of onset of malaria in all the episodes. Significant proportion of them employed the use of LLINs of insecticide treated nets and integrated environmental management principles, but use of Sulphadoxine-Pyrimethamine in pregnancy is not properly adhered to.

RECOMMENDATION

It is imperative to make Sulphadoxine-Pyrimethamine available in the health facilities throughout the season, and adequate health education concerning the prevention of malaria should be provided to the people. Health workers should

be trained on continuous basis to enable them deliver proper knowledge of malaria prevention to the people. Tools for monitoring and evaluation of malaria prevention programmes should be used to monitor compliance and correct gaps that may interfere with long term impact of malaria intervention programmes. Therefore, for Nigeria to achieve the goal as a malaria free nation; there is need to intensify the provision of tailored malaria prevention information, education and communication to the care givers of under five children to maximize utilization of the mainstream intervention programmes provided by the government.

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