Home Management of Malaria: Knowledge, Attitude and Awareness of Mothers in Babcock University

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Abstract: Malaria is an endemic disease in Nigeria that is a major cause of morbidity and mortality in children, especially those under the age of five years old. The home management of malaria has been shown to reduce the rate of morbidity and mortality linked to malaria. The objectives of this study were therefore to determine the knowledge on cause, signs and symptoms of malaria, health seeking behaviour of respondents, preventive measures and Knowledge, Attitude and Practice (KAP) of home management of malaria among mothers in Babcock University for their children. This research was done between April and June, 2018 in Babcock University, Ilishan-Remo, Ogun State. A descriptive study with a cross sectional study design was used. The study population was 274 mothers. A structured questionnaire was used as the instrument for this study. This study revealed that 96.7% of the respondents knew about malaria as a disease. 72.6% of them attributed it to the vector, mosquito, while 4.7% attributed it to the malaria parasite, *Plasmodium*. The commonest recognisable clinical symptom of malaria was headache (75.5%) of the study population. None of the respondents took their children to the native doctor or to Church when symptoms of malaria arose. Rather, they took them to the hospital (80.3%) or to the Pharmacy (11.3%). Regarding preventive measures, 76.6% of them made use of insecticides, which was the commonest preventive measure. In the modality of treatment, it is shown in this study that 69.0% of the mothers knew about Artemisinin Combination Therapy (ACT), which is the recommended treatment drug for malaria treatment by the World Health Organization (WHO). It was also the commonest treatment modality used (68.6%). The commonest ACT combination used was Coartem (Artemether/Lumefantrine) with 59.5% of the respondents patronizing it. The study also showed that mothers in Babcock University are well aware of the dangers of poor compliance (86.5%) and thus ensure that their children completed the drug dose. The mothers in Babcock University have good knowledge, attitude and awareness of home management practices of malaria for their children. These practices are effective in reducing malaria incidence, owing to the fact that majority of them are well educated, as proven by statistical analysis.

Keywords: Malaria, Home Management, Mothers, Babcock University, Knowledge, Awareness and Attitude

1. Background Information

Malaria is a disease caused by *Plasmodium* species transmitted by an infected female anopheles mosquito [1] The known species of malaria parasites are: *Plasmodium falciparum, Plasmodium knowlesi, Plasmodium ovale, Plasmodium vivax* and *Plasmodium malariae;* but the deadliest and commonest form in Nigeria is *Plasmodium falciparum.* Approximately 216 million cases of malaria happened globally in the year 2016 of which the majority (90%) took place in Africa [2]. Nigeria accounted for the highest proportion of cases globally (27%) and it was estimated that of the 445,000 deaths caused by malaria, 407,000 happened in Africa [2].

Malaria disease is endemic in Nigeria [1]. It is a significant cause of death in children, especially those below five years old and prevalent in tropical areas [1]. Malaria presents with symptoms of fever, muscle and joint pains, chills, headaches, anorexia and vomiting in its uncomplicated form, and in its complicated form, it presents with jaundice, hypoglycaemia, convulsions, anaemia and shock [1]. In 2013, 37 million malaria cases were reported in Nigeria; this amount accounts for about 29% of sub-Saharan cases [3]. In about 60% of out-patient care and 30% of hospitalisations, malaria was implicated, hence it is one of the significant causes of death in children below the age of five years [4]. In a study carried out in Owo, Ondo state from May to July 2008 it was revealed that home treatment of fever was prevalent in about 98.4% [5].

In Iwo community in South-western Nigeria, 21% of individuals with no sign or symptom, tested positive to malaria parasite and also had low haematocrit levels [6]. The occurrence of the parasite in Primary Health Facilities (PHF) in the state of Ogun as at 2014 was 71.1% [7]. Malaria can be cured, treated and prevented. This study therefore aims at evaluating the knowledge, attitude and awareness of mothers in Babcock University regarding the home management of malaria of their children while also evaluating their various methods used in the case management of malaria. Babcock University community is predominated by educated mothers but also has uneducated mothers from the surrounding Ilishan community within its environs. This study hence would evaluate the knowledge, attitude and awareness of both the uneducated and educated mothers of Babcock University in managing malaria in the home. The objective of this study would determine the knowledge, attitude and awareness the mothers in Babcock University in the case management of malaria in the home.

1.1. Significance of the Study

This study is aimed at investigating the opinions, aversion and treatment methods mothers in Babcock University use to prevent and manage malaria in the home for their children. This included the use of ACTs, insecticides, mosquito nets and other preventive measures. Also, the various hygienic practices such as clearing of bushes around the home and cleaning up gutters to avoid stagnant water, which are good habitats for the malaria vectors were investigated. This study also assisted in creating awareness for unexposed mothers on the techniques in preventing malaria spread in the home.

1.2. Statement of the Problem

Malaria is the foremost prevalent tropical transmittable disease in the world and a silent killer of members of the nuclear family [8]. As the saying goes, "Charity begins at home". The family is the smallest unit of society and to eradicate any infectious disease, this must begin at home. This project topic was thus borne out of the desire to discover the knowledge and awareness level of mothers in Babcock University and on the management of malaria in their homes.

2. Methodology

2.1. Ethical Approval

Ethical clearance/ approval was obtained from the Babcock University Health Research Ethics Committee (BUHREC) with the Reference Number BUHREC239/18. Informed and written consents were obtained from all the mothers enrolled for this research.

2.2. Study Area and Population

This study was a combination of a descriptive with a cross sectional study design. This study was carried out in Babcock University, Ilishan-Remo, Ogun State, which is located along the Sagamu-Lagos expressway, Ikenne Local Government Area, Ogun State, Nigeria. Its headquarters are in the town of Ikenne at 6°52′N 3°43′E. It has an area of 144 km^2 and a population of 118,735 at the 2006 census. The postal code of the area is 121. The study area included the staff quarters, which had an approximate number of 200 housing units, the in-patient and out-patient units of the hospital, cafeteria, hostels, sport centre, supermarkets and academic departments. The study populations consisted of Babcock female staff and non-staff of the reproductive age who are mothers that reside within the Babcock University Community either temporarily or permanently. A total of 274 mothers were enrolled for this research.

Mothers of the various study areas underwent the survey. An interviewer administered structured questionnaire which was used for data collection after obtaining necessary informed consent. The interviewers were 400 level medical students who were specially trained to administer the questionnaire. The questionnaire sought information on causes of malaria, diagnostic features of malaria, drug of choice for treatment and treatment regimen, compliance rate, and common preventive measures adopted in the home. Questions asked about knowledge include what measures can be used to prevent malaria and what causes malaria infection. A structured questionnaire was administered to the mothers.

2.3. Data Analysis

Data generated from this questionnaire-based study were

analysed using a Statistical Package for Social Sciences (SPSS) version 21.0 and are thus presented in the form of figures (charts) and tables showing the variables, number of respondents and the corresponding percentage of respondents in separate columns. The data were also analysed via the non-parametric Karl Pearson's chi-square (x^2) test.

3. Results

The respondent populations of this study were mothers found within the environs of Babcock University, ranging from those residing at the staff quarters to the lecturers to the non-academic staff at the supermarkets, kiosks, departments, cafeteria, hostels, and even to the patients at the hospital (including those on admission and those on out-patient visit). Of the 290 structured questionnaires given out to 290 different mothers, only 274 were returned and appropriately filled. Of the 274 questionnaires filled, not all the respondents filled all the questions, as some left some portions blank, and thus, most of the results did not add up to 100%. The results are presented in the form of figures (charts) and tables showing the variables, number of respondents and the corresponding percentage of respondents in separate columns.

A total of 274 mothers were used for this study. The demographic characteristics are summarized in (Table 1). Of this total, shows the demographic data of the respondents, including their age, religion, ethnicity, level of education, marital status, number of children, age of children, sex of children and occupation of the mothers enrolled. Of the age groups of the respondents, those within the ages of 30 and 34 years had the highest percentage (33.2%), followed by those above the age of 34 years. The least age group (15 to 19 years) had the least percentage (0.7%). Majority of the respondents were Christians, with a percentage of 89.4%, while only 0.4% were of traditional religion. The respondents were predominantly of the Yoruba ethnicity with a percentage of 49.6%, and the least represented ethnic group was Hausa with a percentage of 2.2%.

The respondents had various occupations but the most frequent occupation was that of Nursing (23.0%) followed by Lecturing (12.1%), Computer Science (12.1%), Trading (9.1%). 7.7% of the respondents were students. A large percentage of the respondents were married (90.1%). 0.4% were separated and widowed, each, 6.2% were single and only 1.1% were divorced.

27.0% of the respondents revealed that they had a total of 2 children, while 26.3% had 3 children. Only 1.1% of the respondents had 6 children. The largest age group of the respondents' children, which was the age group of most importance to this study was that of 0 – 5 years of age, with a percentage of 30.5%. The least age group was that of 16 – 20 years of age, with a percentage of 12.8% (Table 1). From our analysis, it was revealed that the total number of male children that the respondents had was more than that of their female children. The male children were 344 in number (55.1%), while the female children were 280 in number (44.9%) (Table 1).

***Table 1.** Socio-Demographic Information.*

Variable	N (274)	Percentage (%)
Age of Respondent		
15-19	2	0.7
20-24	15	5.5
25-29	51	18.6
30-34	91	33.2
>34	82	29.9
Religion		
Christianity	245	89.4
Islam	16	5.8
Traditional Religion	1	0.4
Others	4	1.5
Ethnicity		
Igbo	56	20.4
Yoruba	136	49.6
Hausa	6	2.2
Others	16	5.8
Education Level		
Primary	4	1.5
Secondary	42	15.3
Tertiary	206	75.2
Marital Status		
Single	17	6.2
Married	247	90.1
Divorced	3	1.1
Separated	1	0.4
Widowed	1	0.4
Number of Children		
1	50	18.2
2	74	27.0
3	72	26.3
4	38	13.9
5	8	2.9
6	3	1.1
Age of Children		
0-5	190	30.5
6-10	121	19.4
11-15	109	17.5
16-20	80	12.8
>20	124	19.8
Sex of Children		
Male	344	55.1
Female	280	44.9
Occupation		
Computer Science	33	12.1
Admin	12	4.5
Banker	5	1.8
Caterer	6	2.2
Trader	26	9.1
Lawyer	1	0.4
Lecturer	33	12.1
Nursing	63	23.0
Pharmacist	1	0.4
Retired	1	0.4
Receptionist	5	1.8
Sw	1	0.4
Security	3	1.1
Politics	1	0.4
Medical-Allied Profession	3	1.1
Medical Doctor	2	0.7
MLS	2	0.7
Librarian	4	1.5
Skilled labour	18	6.6
Apprentice	1	0.4
Student	21	7.7

Table 2. Respondents' Knowledge on Malaria.

Variables	N (274)	Percentage (%)
Commonest Sickness		
Malaria	237	86.5
Fever	13	4.7
Experienced Fever recently		
Yes	189	69.0
No	82	29.9
Know About Malaria		
Yes	265	96.7
No	4	1.5
Causes of malaria		
Mosquito bite	199	72.6
Malaria parasite	13	4.7
Dirty environment	11	4.0
I don't know	3	1.1
Mosquito and dirty environment	2	0.7
Have your children had malaria before?		
Yes	246	89.8
No	16	5.8
I don't know	1	0.4
How often do you or your children have malaria?		
Once a month	23	8.4
Once in three months	107	39.1
Once in six months	119	43.4

The knowledge that the respondents had known malaria as a disease. 237 (86.5%) of the respondents identified malaria as the commonest sickness in Babcock University, while 13 of them identified it to be fever (4.7%). Not surprisingly, a large number of the respondents (265) claimed to know about malaria, making a total of 96.7%. However, 4 of the respondents claimed to not know about malaria (1.5%). A great number of respondents knew the causes of malaria. 72.6% of them attributed it to the vector, mosquito, while 4.7% attributed it to the malaria parasite, *Plasmodium*. 1.1% of the respondents revealed that they did not know what the cause of malaria was, while 4.0% thought it to be due to dirty environment. 43.4% of the respondents were aware that their children had malaria once in six months, 39.1% had their children come down with malaria once in three months, and 8.4% had their children being infected with malaria parasite monthly (Table 2).

This study gives reveals the extent to which mothers in Babcock University knew about the symptoms and clinical signs of malaria as seen in their children. It further exposes their understanding on knowledge and awareness of malaria as a disease. It was observed from the study that 75.5% of the enrolled population recognised headache, 71.5% recognised loss of appetite, and 65.0% recognised fever when their children have malaria, and they recognised them as symptoms of malaria. It was however observed that 60.2% of their children did not have chills and rigors, 85.0% did not have skin rash, 60.6% did not vomit, 74.1% did not have pale eyes, 65.7% did not have stomach ache while having Malaria and thus did not recognise them as symptoms of Malaria in their children (Figure 1).
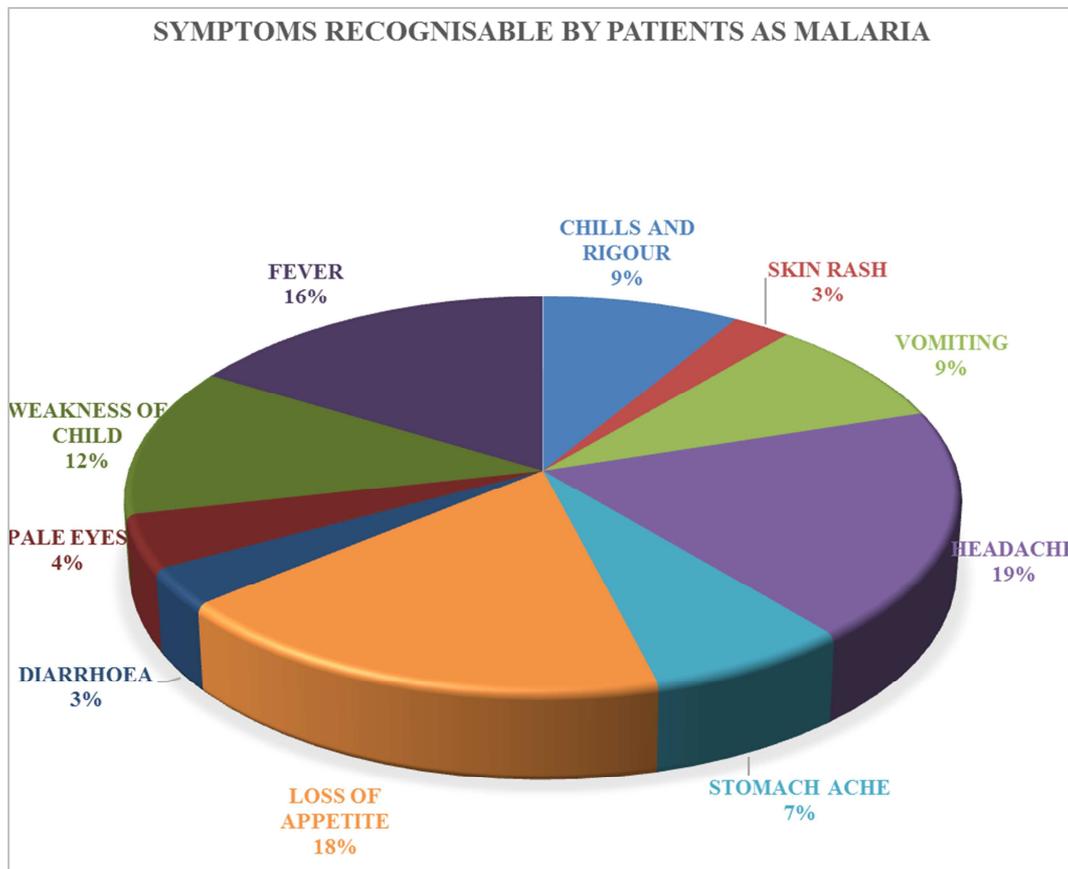
Figure 1. Malaria clinical symptoms identified by Respondents.

The higher the level of education, the more knowledgeable the mothers were about malaria, its causes and symptoms. The p-value is significant because it is less than 0.05, therefore, we reject the null hypothesis and accept the alternative hypothesis which states that there is a relationship between the level of education of mothers in Babcock University and their knowledge and awareness of malaria (Table 3).

Table 3. Influence of level of Education versus Knowledge of Malaria among Repondents.

Knowledge of Malaria		Level of Education			X^2	P-Value
		Primary N (%)	Secondary N (%)	Tertiary N (%)		
Know about Malaria	Yes	3 (75.0)	42 (100)	201 (97.6)	68.094	0.000*
	No	1 (25.0)	0 (0)	03 (1.5)		
Causes of Malaria	Mosquito	3 (75.0)	29 (69.0)	157 (76.2)	61.407	0.000*
	Malaria parasite	0 (0)	0 (0)	13 (6.3)		
	Dirty environment	0 (0)	03 (7.1)	04 (1.9)		
	I don't know	0 (0)	02 (4.8)	1 (0.5)		
Symptoms	Chills and rigor	0 (0)	22 (52.4)	69 (33.5)	29.388	0.016*
	Vomiting	03 (75.0)	11 (26.2)	79 (38.3)		
	Headache	04 (100)	33 (78.6)	155 (75.2)		
	Stomach ache	0 (0)	08 (19.0)	64 (31.1)		
	Loss of appetite	02 (50)	30 (71.4)	157 (76.2)		
	Fever	1 (25.0)	26 (61.9)	151 (73.3)		
	Diarrhea	0 (0)	07 (16.7)	26 (12.6)		
	Paleness	0 (0)	04 (9.5)	43 (20.9)		
	Skin rash	0 (0)	04 (9.5)	24 (11.7)		

*Significant at P < 0.05.

Null hypothesis (H$_0$): There is no relationship between the level of education of mothers in Babcock University and their knowledge and awareness of malaria (H$_0$: p ≥ 0.05). Alternative hypothesis (H$_1$): There is a relationship between the level of education of mothers in Babcock University and their knowledge and awareness of malaria (H$_1$: p < 0.05)

Most of the respondents/ mothers did not notice any complicated clinical signs of malaria among their children. 43.1% of them were not aware that jaundice was a complicated sign, only 7.3% of them identified convulsion as a complicated sign, 21.5% of them noticed dark urine as a complicated sign of malaria, while 33.6% of them did not identify prostration as a complicated sign of malaria (Table 4). The preventive measures the respondents practiced in their homes to curb the infestation of the vector of malaria, mosquito. 97.8% of them cleaned their homes regularly, 85.8% of them did not live in swampy areas, while 45.8% of them used mosquito bed nets. However, not all had their mosquito bed nets treated as only 40.5% of the respondents had their mosquito bed net treated (Table 5).

Table 4. The knowledge of Respondent to complicated signs associated with malaria.

Variables	N (274)	Percentage (%)
Jaundice		
Yes	31	11.3
No	118	43.1
Convulsion		
Yes	20	7.3
No	119	43.4
Confusion		
Yes	10	3.6
No	121	44.2
Dark urine		
Yes	59	21.5
No	84	30.7
Prostrastion		
Yes	73	26.6
No	92	33.6

Table 5. Preventive measures on malaria infection at homes.

Variables	N (275)	Percentage (%)
Do you clean your environment regularly?		
Yes	268	97.8
No	3	1.1
Do you live near swampy areas or areas where there is stagnant water?		
Yes	31	11.3
No	235	85.8
Do you sleep with mosquito net		
Yes	126	45.8
No	142	51.6
Is the mosquito net treated?		
`Yes	111	40.5
No	42	15.3

There was increased incidence of malaria among respondents' children that did not make use of mosquito bed nets. The p-value is significant because it is less than 0.05, therefore, we reject the null hypothesis and accept the alternative hypothesis which states that there is a relationship between the utilization of mosquito bed nets by mothers in Babcock University and the incidence of malaria in their household among their children (Table 6).

Table 6. *The importance of the use of treated mosquito nets on the prevalence of malaria among Respondents' children.*

| MAKE USE OF MOSQUITO BED NETS | PREVIOUSLY HAD MALARIA | | X^2 | P-VALUE |
	YES N (%)	NO N (%)		
YES	113 (45.9)	08 (50)	15.121	0.019*
NO	129 (52.4)	08 (50)		

*Significant at P < 0.05.

Null hypothesis (H_0): There is no relationship between the utilization of home management practices by mothers in Babcock University and the incidence of malaria in their household (H_0: p ≥ 0.05). Alternative hypothesis (H_1): There is a relationship between the utilization of home management practices by mothers in Babcock University and the incidence of malaria in their household (H_1: p < 0.05).

In this study there was an increased incidence of malaria among respondents' children that did not clean their environment. The p-value is significant because it is less than 0.05, therefore, we reject the null hypothesis and accept the alternative hypothesis which states that there is a relationship between the cleanliness of environment of mothers in Babcock University and the incidence of malaria in their children (Table 7).

Table 7. *Influence of cleanliness of environment on incidence of malaria among Respondents' children.*

| Cleanliness of Environment | | Previously had malaria | | X^2 | P-Value |
		Yes N (%)	No N (%)		
Do you clean your environment regularly?	Yes	243 (90.7)	16 (6.0)	55.460	0.000*
	No	02 (66.7)	0 (0)		

*Significant at P < 0.05.

Null hypothesis (H_0): There is no relationship between the cleanliness of environment of mothers in Babcock University and the incidence of malaria in their children (H_0: p ≥ 0.05).

Alternative hypothesis (H_1): There is a relationship between the cleanliness of environment of mothers in Babcock University and the incidence of malaria in their children (H_1: p < 0.05).

This study also revealed that the treatment knowledge and practices of malaria among the mothers in Babcock University. It was shown that the largest percent of mothers (69.0%) knew about Artemisinin Combination Therapy

(ACT), which is the recommended treatment modality for malaria by the World Health Organization (WHO). It was also shown that the commonest treatment modality used by the respondents was the Artemisinin Combination Therapy (188 respondents, 68.6%). Although a few, it was seen that a number of respondents still practiced the use of traditional treatment of malaria with the use of *Agbo,* making up 7.7% of the respondents. 195 (71.2%) of the respondents attested to the fact that they kept drugs at home and thus medicated their children whenever symptoms of malaria arose (Table 8).

Table 8. *Treatment, Knowledge, and Awareness of Malaria among Respondents.*

Variable	Frequency (N)	Percentage (%)
Therapy used at home		
Chloroquinine	30	10.9
Artemisinin Combination Therapy (ACTs)	188	68.6
Agbo	21	7.7
Do you keep drugs at home?		
Yes	195	71.2
No	58	21.2
Do you know what ACTs are?		
Yes	189	69.0
No	60	21.9
Do you use ACTs at home for your children?		
Yes	184	67.2
No	39	14.2

It was seen that Artemether / Lumefantrine, under the trade name Coartem, was the most commonly used ACT with 59.5% of the respondents making use of it. Following it was Artesunate / Amodiaquine, under the trade name Camoquin, with 21.2% of respondents making use of it. 18.2% of respondents used

Artesunate / Pyronaridine, 17.2% used Artesunate / Mefloquine, 11.7% used Artesunate / Sulfadoxine-Pyrimethamine, 5.1% used Dihydroartemisinin / Piperaquine, and only 2.9% used Arterolane / Piperaquine, making it the least used ACT by the respondents (Figure 2).
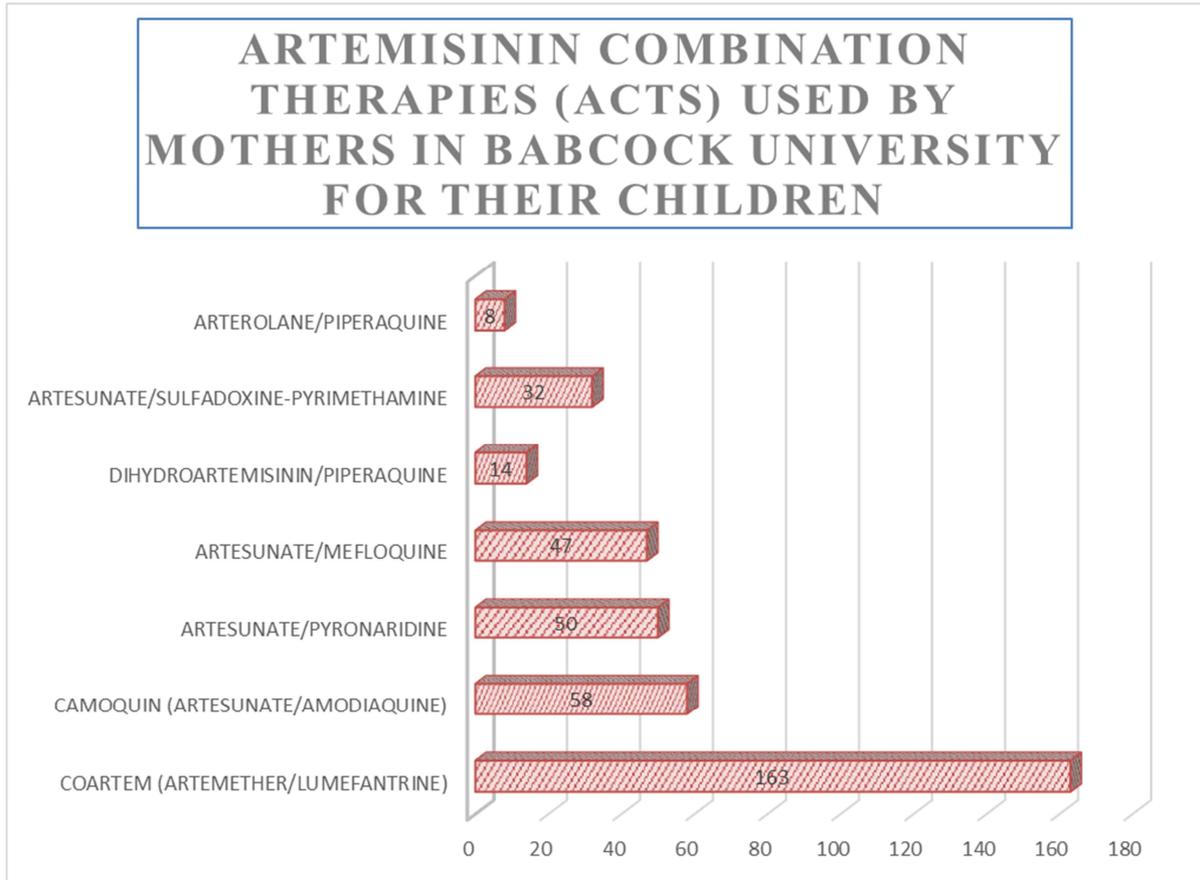
Figure 2. *ACTs used by mothers in Babcock University for their children.*

The compliance rate of the respondents when using drug treatment for malaria for the children. A total of 250 respondents found it important to finish the drug as prescribed, while only 10 felt it not important. 237 respondents were aware of the danger of not completing the drug usage and as such 223 respondents ensured that their children finished the drugs as prescribed, even if their children felt better during the course of the treatment (Table 9). Only 13 of the respondents, making up 4.7%, did not follow the dose schedule at correct intervals as prescribed.

Table 9. *ACTs usage compliance rate among respondents.*

Variables	Frequency (N)	Percentage (%)
Do you think that it is important to complete your antimalarial dose as Prescribed?		
Yes	250	91.2
No	10	3.6
Is there danger in not completing your drug dose?		
Yes	237	86.5
No	29	10.6
Do you ensure that your children complete the drugs as prescribed?		
Yes	249	90.9
No	12	4.4
Do you ensure your children follow the dose schedule at correct intervals?		
Yes	248	90.5
No	13	4.7
If your children feel better while using the drugs, do you ensure they still continue using it until it is completed?		
Yes	223	81.4
No	35	12.8

The higher the level of education, the more the mothers ensured children's drug compliance. The p-value is significant because it is less than 0.05, therefore, we reject the null hypothesis and accept the alternative hypothesis which states that there is a relationship between the level of education of mothers in Babcock University and the compliance rate of the drug they used for their children (Table 10).

Table 10. *Influence of level of Education versus compliance rate of the antimalarials used by Respondents for their children.*

COMPLIANCE RATE OF DRUG USE FOR CHILDREN		Level of Education			X^2	P-VALUE
		PRIMARY N (%)	SECONDARY N (%)	TERTIARY N (%)		
ENSURE CHILDREN FINISH MALARIA DRUG	YES	03 (75.0)	37 (88.1)	191 (92.7)	16.222	0.039*
	NO	01 (25.0)	02 (4.8)	07 (3.4)		
ENSURE CHILDREN FOLLOW DOSE SCHEDULE	YES	03 (75.0)	38 (90.5)	190 (92.2)	21.943	0.005*
	NO	01 (25.0)	01 (2.4)	08 (3.9)		

*Significant at $P < 0.05$.

Null hypothesis (H_0): There is no relationship between the level of education of mothers in Babcock University and the compliance rate of the drug they used for their children (H_0: $p \geq 0.05$). Alternative hypothesis (H_1): There is a relationship between the level of education of mothers in Babcock University and the compliance rate of the drug they used for their children (H_1: $p < 0.05$).

4. Discussion

Studies carried out in the past showed that the understanding and behaviour mothers have towards malaria and similar situations is paramount in attaining efficacious control of the disease in endemic regions [9-11]. This study therefore aimed at determining the level of knowledge, attitude and extent of practice of home management of malaria for their children among mothers in Babcock University. From the results stipulated from this research, it showed that 265 (96.7%) of mothers in Babcock University were aware of the disease, malaria. This correlates with 86.5% of them who identified it as the commonest disease in their environment. This is in line with the study that was done in Umunneochi Local Government Area of Abia State, Nigeria in 2010, wherein 88.3% had the right perception that malaria is an illness/disease [12], and also in another study where 95.1% of the respondents had heard about malaria in rural communities in Imo State, Nigeria in 2013 [13]. A total of 69.0% of the respondents had just experienced fever of recent, which suggests the endemicity of malaria in the study site since it was identified to be the commonest sickness [13].

It is seen from this study that majority of the respondents were aware of the cause of malaria. 72.6% of them identified mosquito as the vector transmitting the *Plasmodium* parasites that causes malaria infection. This can be attributed to the fact that a large percentage of the respondents were of tertiary education (75.2%) with 25.9% of the population being health workers (nurses, medical doctors, pharmacists, medical laboratory scientists) and 7.7% being students. Also collaborating this attribution is the presence of a significant relationship between the level of education and the knowledge of the cause of malaria as calculated by the chi-square test. This is similar to the study that was carried out in Owo, Ondo state in Nigeria wherein 72.6% of the respondents attributed the cause of malaria to be due to mosquito bite [5].

This research exposed the need for mothers to know and recognize malaria symptoms early so as to promptly treat and avert death of children. The respondents in this study showed adequate knowledge about malaria symptoms as they correctly identified fever, loss of appetite, body weakness, headache, vomiting, chills and rigour as symptoms of malaria. This agrees with studies conducted in rural communities of Ise-Orun, Ekiti, Nigeria [14]. The commonest symptom of malaria identified by the mothers in Babcock University in their children was headache (75.5%). This is dissimilar to two different studies that was carried out in Imo and Ogun states in 2013 and 2017 with fever being the commonest symptom identifiable in both studies [13, 15]. It is interesting to note that none of the mothers in Babcock University took their children to the native doctor or to church when they came down with clinical symptoms of malaria, as opposed to the studies conducted in Ondo state, Nigeria in 2017, where 3.1% of the study population visited herbalists (Liasu, *et al*, 2017); in Abia state, Nigeria in 2010, 1.1% of the study population visited churches and 8.7% visited herbalists [12]; and in Imo state, Nigeria in 2013, 4.4% of the study population visited prayer homes and 7.9% herbalists [13]. This is attributable to the fact that there was a larger percentage of mothers with tertiary education in this study in Babcock University than in the other studies. The health seeking behaviour of mothers in Babcock University when their children come down with malaria is to visit the hospitals (80.3%) and Pharmacy/chemists (11.3%). This could also be attributed to the closeness of health facilities as there is a teaching hospital within the campus of Babcock University, unlike in previous studies [5, 12, 13].

The respondents in this study were active in the use of preventive measures against malaria. It is observed from this study that asides cleaning their environment, the commonest preventive measure against malaria used by mothers in Babcock University is insecticide. This is an improvement when compared to a study by [16] in University of Benin whereby the highest preventive measure used was window gauze (35%) with 'insecticides and window gauze' being at 30% [16]. This shows an improvement in awareness of better preventive methods amongst mothers over the years. The same was also seen in a study by [17, 18] done in Olambe, Ogun state (population sample of 250 mothers), where the highest preventive measure was also use of insecticides (30.8%) [17, 19, 20].

With regards to the use of mosquito nets, 45.8% of the population were aware of and utilised mosquito bed nets which is the second highest, the same with the study by [13] in rural communities in Imo state, it was at 39.2%, and the study by [17, 21] it was second highest at 17.7% [13, 17]. This is yet another good show of awareness among mothers in Babcock University. However, being that less than half of

our study population made use of mosquito bed nets, it could be due to unavailability of the resources. In our study, 14.2% of the population were also in practice of using mosquito coils, the study by 15.6% of the study used mosquito coils and in the study by [13, 22] showed 26.1% of the population used mosquito coils. The two studies are both higher than that of Babcock University and this is probably because of the confined, private environment in Babcock University which would hardly accommodate the pungent smell of the mosquito coils, so therefore the low use of mosquito coils in Babcock University. The use of these preventive measures was also shown to have a relationship with the level of education of the respondents.

In the treatment of malaria, this study reveals that a large percentage (69.0%) of mothers knew about Artemisinin Combination Therapy, which correlates with the 68.6% of them that used it to treat malaria for their children. This could be attributable to the fact that these respondents took their children to the hospital when they suspected malaria and thus got those drugs prescribed. It could also be attributable to the fact that a sizeable amount of them were health workers and of the tertiary education, which was proven by chi-square test to have a significant relationship. 10.9% of the respondents used Chloroquine as drug treatments for their children [22, 23]. This finding is contrary to what was obtained in a study in Imo state, Nigeria in 2013 by Nwoke, *et al*, where 25.8% of the respondents used Chloroquine and 30.2% used an Artemisinin-based Combination Therapy [13, 24].

In this research, 7.7% of the mothers in Babcock University identified the use of *Agbo*, which is a form of herbal preparation as treatment that they used for their children when they came down with clinical symptoms of malaria. This is correlates with the result seen in studies in Ondo state, Nigeria [5], and in Ogun state, Nigeria [15]. Among the ACT, Artemether/Lumefantrine was the most used by mothers. This is likely due to its availability, low cost, efficacy and frequent prescription by health care workers [17-19].

The compliance rate assessed in the respondents in this study was very high. 91.2% of them thought it important to finish drugs as prescribed and 90.9% of them ensured that their children finished their drugs as prescribed. 86.5% of the respondents recognised the danger in not finishing the dose of the drugs as prescribed and thus they ensured that their children finished using it even when they felt better while using them. This high rate of compliance seen in mothers in Babcock University when treating malaria in their children was seen to be significantly influenced by their level of education. Therefore, there should be minimal levels of drug resistance since the rate of drug compliance is high.

5. Conclusion

This study has revealed that the mothers in Babcock University have good knowledge and awareness of home management practices of malaria for their children. These home management practices include taking preventive measures against the malaria vector, mosquito, recognising malaria symptoms, appropriate health seeking behaviour, the use of standard drug treatment for malaria and ensuring compliance to the prescribed drugs. It is therefore safe to conclude that the home management of malaria by mothers of children in Babcock University is effective, owing to the fact that majority of them are well educated and thus have good knowledge of the disease and good health seeking behaviour to tackle the disease in their children. These home management practices are effective in reducing malaria incidence, owing to the fact that majority of them are well exposed to malaria management, as proven by statistical analysis

6. Recommendation

Enlightenment campaign is needed to change the people's perception on the cause of malaria for effective malaria control in the community. Focus on malaria control interventions should be extended to the adults in Babcock University community.

Conflict of Interests

The authors declare that they have no conflict of interests.

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