Knowledge of Malaria Management among Healthcare Workers in Dass Local Government Area of Bauchi State, Nigeria

Hassan, H.F.[1*], Umar, A.F.[2], Hassan, N.M.[3], Hassan, H.F.[4], Ahmed, I.[5], Hassan, A.F.[4], Atiku, K.J.[6], and Hassan, S.F.[2]

[1]Department of Community Medicine, Aminu Kano Teaching Hospital, Kano State, Nigeria
[2]Department of Microbiology, Abubakar Tafawa Balewa University, Bauchi, Bauchi State, Nigeria
[3]Department of Business Administration, Federal University of Kashere, Gombe State, Nigeria
[4]Women & Children Hospital, Bauchi, Bauchi State, Nigeria
[5]Department of Anatomy, College of Medical Sciences, Abubakar Tafawa Balewa University, Bauchi, Bauchi State, Nigeria
[6]Department of surgery, Modibbo Adama University Teaching Hospital, Yola, Adamawa State, Nigeria
**Corresponding Author*

***Abstract*: Malaria is one of the most important and widespread disease entity in the tropics. It is caused by the blood coccidian (protozoan plasmodium) parasite. Malaria poses a major concern to both human capital and economic development among others factors in endemic areas of Nigeria. The study aimed to assess the level of knowledge of malaria management and factors associated with the knowledge of malaria management among healthcare workers (HCWs) in Dass Local Government Area of Bauchi State, Nigeria. A multi-stage sampling was used to sample HCWs. Using a cross sectional study, a schedule was used to retrieve data from 223 HCWs. 123 (55.2 %) of the respondents have good knowledge of the management of malaria. More than 50.0 % of the respondents knew the symptoms of malaria and how to treat it. The Pearson's chi square test for independence revealed no statistically significant association ($p \geq 0.05$) between the knowledge of malaria management and the sociodemographic characteristic variables among HCWs. The study indicated that majority of HCWs in the study have good knowledge of malaria management. There are however, many HCWs who still have poor knowledge of malaria management. The knowledge of malaria management indicated no significant relationship with the sociodemographic variables. There is therefore the need for the Government and Hospital Management to ensure regular, proper and continuous medical education of the healthcare workers so as to improve the quality and standards of healthcare service delivery.**

***Keywords*: Knowledge, *Plasmodium spp.*, asymptomatic malaria, healthcare workers and multi-stage sampling method**

I. INTRODUCTION

Healthcare workers (HCWs) play a vital role in the provision of healthcare services. However, they are also affected by the occupational health-related problems ranging from communicable to non-communicable diseases in the process (Abegunde et al., 2016). Malaria is a common disease with public health challenges with nearly 50 % of the world's population (3.28 - 3.4 billion) living in risky environments with poor sanitation and high malaria infections prevalence (Bassey & Izah, 2017; *Malaria*, n.d.). Malaria is associated with major concerns to both human capital and economic development in addition to others factors in endemic areas of Nigeria (Enato et al., 2007; Nwanosike et al., 2015; Ukpong et al., 2015).

Poor knowledge exists among HCWs about the management of malaria posing strong challenges and influences on the side of their treatment practices and patients management as a whole (Onwujekwe et al., 2009). Poor knowledge on the prevention strategies for malaria exists among primary HCWs with fairly adequate knowledge of the basic concepts of malaria and malaria management, but poor treatment practices (Onwujekwe et al., 2009). The prevalence of malaria among the population can be reduced through increased knowledge of malaria management among HCWs, improved attitude, practice of environmental sanitation and enlightenments among the population (Adefioye *et al.*, 2007). The aim of the study is to assess the level of knowledge of malaria management and factors associated with the knowledge of malaria management among healthcare workers (HCWs) in Dass Local Government Area of Bauchi State, Nigeria.

II. METHODOLOGY

II.1 Description of the Study Area

The study was conducted in Dass Local Government Area, a semi-urban settlement created in 1976 with full administrative function at the same time with the creation of the then Bauchi State. It is located in the Southern part of Bauchi State. It has a 2006 National Population Commission Census of 90,114 with an annual growth rate (AGR) of 3.4 %. The town is divided into 13 political wards: Bagel, Baraza, Bundot, Bununu Central, Bununu East, Bununu South, Bununu West, Dott, Durr, Lukshi, Polchi, Wandi and Zumbul respectively. The town has one (1) General Hospital which has a total of 78 skilled staff and thirty-nine (39) Primary Healthcare Centers (PHCs) with a total of 301 skilled staff. The major ethnic groups are Jarawa, Hausa-Fulani, Zumbulawa, Bankalawa, Lukshawa, Barazawa, Polchawa, Dotdawa, Wandawa and Durrawa, as well as other minority ethnic groups. The dominant religions are Islam and Christianity. The civil servants include medical personnel of

diverse professions such as medical doctors, nurses, pharmacists and medical laboratory scientists employed in the public and private sectors. The inhabitants often visit traditional healers and religious prayer houses for the purpose of obtaining treatment for their illnesses.

II.2 Study Design

The study employed a hospital-based descriptive cross-sectional study design for the quantitative data collection from eligible HCWs.

II.3 Sample Size Determination

The minimum sample size (n) was estimated using a single proportion Cochran's formula (Nmadu et al., 2016), where z_α = standard normal deviate corresponding to an α-risk of 5 % = 1.96, p = proportion of HCWs estimated to have knowledge of malaria = 0.50, q = complimentary probability (proportion of HCWs with no knowledge of malaria) = 1.0 – p = (1.0 – 0.50) = 0 .50, d = desired degree of precision set at 0.05 (5 %). A calculated sample size, n = 384.16 was obtained.

The study population has a finite population size (sampling frame) of (N = 379) and the sampling fraction, n/N = 1.33 > 0.05 (5.0 % of the finite population size). The Cochran correction formula **(sample size/(sampling fraction + 1))** yielded a final sample size, n_c = 191 which was rounded up to 200 to compensate for non-response (s) and incomplete response (s) (Nmadu et al., 2016).

II.4 Data Management

II.4.1 Measurement of variables

The outcome variable for the study is the knowledge of malaria management (initially a 4-point Likert response scale ordinal categorical variable, but dichotomized). The independent variables were the sociodemographic variables (age group, gender, marital status, ethnicity, years of experience and family size) of HCWs. Gender is a categorical nominal dichotomous variable. Age group, marital status, ethnicity, years of experience and family size were categorical nominal polytomous variables, but were later transformed into categorical nominal dichotomous as well.

II.4.2 Data analysis

Data were entered into MS Excel, v. 2016, cleaned and then imported into IBM SPSS v. 22 for the initial exploration and analysis of the data. Categorical variables were presented using standard frequencies and percentages, pie charts and/or bar charts where appropriate.

The knowledge of malaria management has four (4) constructs: knowledge of transmission, knowledge of symptoms of malaria, knowledge of treatment and knowledge of prevention constructs. The constructs have a total of 23 items on a 4 Point-Likert response scale (6 items on knowledge of transmission, 6 items on knowledge of symptoms of malaria, 6 items on knowledge of treatment and 5 items on knowledge of prevention) with 1 = strongly disagree (SD), 2 = disagree (D), 3 = agree (A) and 4 = strongly agree (SA). Respondents who correctly answer an item (i.e. strongly agree (SA) or agree (A)), one (1) point was awarded and for any incorrect response (i.e. disagree (D) or strongly disagree (SD)), zero (0) was awarded. However, for the first item (clearing of bushes is not important) under knowledge of prevention, one (1) point was awarded for respondents who answer "disagree (D) or strongly disagree (SD)" and zero (0) point for "strongly agree (SA) and agree (A)" responses. The individual total knowledge score was obtained using the sum of all the items scored under each construct in the knowledge of malaria management. The overall knowledge score for each respondent was computed by summing all the individual construct total knowledge scores. The mean score for the respondents was obtained by dividing the overall knowledge score with the total number of respondents. Respondents who score equal to or greater than the mean score were categorized as having good knowledge and those who score below the average score were categorized as having poor knowledge as adapted from a previous study (Fuge et al., 2015).

Comparison of categorical variable factors for association were conducted using a two-tailed Pearson's Chi Square test of independence and/or Fisher's Exact test where applicable. In all tests of significance, $p < 0.05$ was considered statistically significant.

II.5 Ethical Consideration

The study was approved by the Bauchi State Health Research Ethics Committee (BASHREC), Ministry of Health (MoH). Permission obtained from the Local Government Health Authority (LGHA) Director and heads of health facilities (HFs) to apply the questionnaire on the participants (HCWs). Finally, all consented HCWs were given a written consent form to sign prior to questionnaire administration.

III. RESULTS AND DISCUSSION

III.1 Results

A total number of 223 HCWs participated in the study, 127 (57 %) of 223 HCWs were males (females constituted 43 %). Married HCWs constituted 148 (66.4 %) out of a total of 223. The participants' tribes included Jarawa (90, 40.4 %), Bankalawa (48, 21.5 %), Hausa-Fulani (15, 6.7 %) and other ethnic groups (70, 31.4 %). Other ethnic groups included Sayawa, Igbo, Yoruba, Lukshawa, Barazawa, Polchawa, Dotdawa, Wandawa and Durrawa. 125 (56.1 %) of the respondents had less than five (5) years of working experience followed by the HCWs who had at least six (6) years (98, 43.9 %).

III.1.1 Respondent's Level of Knowledge of Malaria Management

The knowledge of transmission of malaria shown in Table 1 indicated that greater than half of the respondents knew malaria parasite as the cause of malaria (94.6 %), the different species of plasmodia (83.4 %) and malaria transmission (vertical transmission) from mother to the baby during pregnancy (62.4

%). However, less than 50 % knew that only the infected female anopheles' mosquito causes malaria (35.9 %), transmission of malaria through blood transfusion from an infected person (46.2 %), transmission of malaria from the use of infected hollow needles (21 %).

Respondents who strongly agree (136/223, 61 %) and agree (75/223, 33.6 %) that different species of malaria parasites are responsible for causing malaria. 80 out of 223 (35.9 %) of the respondents (strongly agree (52/223, 23.3 %), agree (28/223, 12.6 %)) knew that malaria is not caused by the female anopheles' mosquito, but has to be infected. 186 out of 223 (strongly agree (89/223, 39.9 %) and agree (97/223, 43.5 %)) respondents were knowledgeable about malaria being caused by different species of plasmodia and 139 (62.4 %) out of 223 respondents (strongly agree (53/223, 23.8 %) and agree (86/223, 38.6 %)) knew that malaria can be transmitted from mother to the baby during pregnancy. 103 (46.2 %) out of 223 participants knew (strongly agree (37/223, 16.6 %) and agree (66/223, 29.6 %)) that malaria can be transmitted through transfusion of blood from an infected person and 47 (21 %) out of 223 respondents (strongly agree (15/223, 6.7 %) and agree (32/223, 14.3 %)) through the use of infected hollow needles.

Table 1: Parameters for the Assessment of Knowledge of Transmission of Malaria

Knowledge of transmission of malaria	Frequency (Percent)			
	SA	A	D	SD
Malaria is caused by malaria parasite	136 (61.0)	75 (33.6)	8 (3.6)	4 (1.8)
Malaria is not caused by female anopheles mosquito	52 (23.3)	28 (12.6)	63 (28.3)	80 (35.9)
Malaria can be caused by different species of plasmodia	89 (39.9)	97 (43.5)	28 (12.6)	9 (4.0)
Malaria can be transmitted from mother to the baby during pregnancy	53 (23.8)	86 (38.6)	56 (25.1)	28 (12.6)
Malaria can be transmitted through transfusion of blood from an infected person	37 (16.6)	66 (29.6)	73 (32.7)	47 (21.1)
Malaria can be transmitted from the use of infected hollow needles	15 (6.7)	32 (14.3)	106 (47.5)	70 (31.4)

Values are frequencies (percent), n = 223

SA = Strongly agree, A = Agree, D = Disagree, SD = Strongly disagree

The knowledge of symptoms of malaria in

Table 2 shows that more than 50 % of the respondents knew the symptoms of malaria. Only 2 (0.8 %) out of 223 respondents lack knowledge of fever (disagree (1, 0.4 %) and strongly disagree (1, 0.4 %)), chills/rigor (23/223, 10.3 %), headache (10/223, 4.5 %), insomnia (72/223, 32.3 %), loss of appetite (6/223, 2.6 %) and diarrhoea (68/223, 30.5 %) as non-specific symptoms of malaria.

Table 2: Parameters for the Assessment of Knowledge of Symptoms of Malaria

Knowledge of symptoms of malaria	Frequency (Percent)			
	SA	A	D	SD
Fever	145 (65.0)	76 (34.1)	1 (0.4)	1 (0.4)
Chills/rigor	105 (47.1)	94 (42.2)	19 (8.5)	4 (1.8)
Headache	113 (50.7)	100 (44.8)	6 (2.7)	4 (1.8)
Insomnia (or lack of sleep)	59 (26.5)	92 (41.3)	59 (26.5)	13 (5.8)
Loss of appetite	98 (43.9)	119 (53.4)	5 (2.2)	1 (0.4)
Diarrhoea	42 (18.8)	113 (50.7)	46 (20.6)	22 (9.9)

The knowledge of treatment of malaria shown in

Table 3 indicated that more half of the participants knew how to treat malaria, but only 87 (39 %) of 223 respondents (strongly agree (20, 9 %) and agree (67, 30 %)) knew that chloroquine is not recommended as first-line treatment of uncomplicated malaria. Only 6 (2.7 %) out of 223 respondents lack the knowledge that Artemisinin-based Combination Therapy is recommended in the treatment of uncomplicated malaria (disagree (4, 1.8%) and strongly disagree (2, 0.9 %)).

Table 3: Parameters for the Assessment of Knowledge of Treatment of Malaria

Knowledge of treatment of malaria	Frequency (Percent)			
	SA	A	D	SD
Chloroquine is not recommended as first-line uncomplicated malaria treatment	20 (9.0)	67 (30.0)	86 (38.6)	50 (22.4)
Artemisinin-based Combination Therapy is recommended as first-line uncomplicated falciparum malaria treatment	152 (68.2)	65 (29.1)	4 (1.8)	2 (0.9)
Quinine is an alternative drug in malaria treatment	44 (19.7)	121 (54.3)	50 (22.4)	8 (3.6)
Paracetamol is not used in malaria treatment	78 (35.0)	105 (47.1)	32 (14.3)	8 (3.6)
Sulphadoxine Pyrimethamine is not ideal for uncomplicated malaria treatment	37 (16.6)	117 (52.5)	51 (22.9)	18 (8.1)
B-complex is not recommended in malaria treatment	41 (18.4)	122 (54.7)	40 (17.9)	20 (9.0)

The knowledge of prevention of malaria as indicated in

Table 4 showed that 168/223 (75.3 %) of the participants knew that clearing of bushes is important in the prevention of malaria (disagree (62, 27.8 %) and strongly disagree (106, 47.5 %)). More than half of the participants have the knowledge that use of insecticide treated nets (strongly agree (151, 67.7 %) and agree (69, 30.9 %)), mosquito repellents and mosquito sprays (strongly agree (91, 40.8 %) and agree (119, 53.4 %)), proper

drainage systems (strongly agree (115, 51.6 %) and agree (104, 46.6 %)) and seasonal malaria chemoprevention (strongly agree (95, 42.6 %) and agree (101, 45.3 %)) are all important in the prevention of malaria.

Table 4: Parameters for the Assessment of Knowledge of Prevention of Malaria

Knowledge of prevention of malaria	Frequency (Percent)			
	SA	A	D	SD
Clearing of bushes is not important	32 (14.3)	23 (10.3)	62 (27.8)	106 (47.5)
Use of Insecticide Treated Nets is important	151 (67.7)	69 (30.9)	2 (0.9)	1 (0.4)
Use of Mosquito Repellents, Mosquito Sprays are important	91 (40.8)	119 (53.4)	12 (5.4)	1 (0.4)
Ensuring proper drainage system is important	115 (51.6)	104 (46.6)	2 (0.9)	2 (0.9)
Seasonal Malaria Chemoprevention is important in preventing malaria	95 (42.6)	101 (45.3)	23 (10.3)	4 (1.8)

The minimum and the maximum points scored by the respondents out of the total 23 items under knowledge of malaria management among respondents were 10 and 22 points respectively with a mean knowledge score of 15.70 ± 2.20 points. Generally, 123 (55.2 %) out of 223 respondents have good knowledge of the management of malaria as depicted in Table 5.

Table 5: Distribution of Respondents Knowledge of Malaria Management

Knowledge	Frequency (n = 223)	Percentage (%)
Poor	100	44.8
Good	123	55.2

III.1.2 Factors Associated with Respondent's Level of Knowledge of Malaria Management

Table 6 shows a bivariate analysis between knowledge of malaria management and the sociodemographic characteristic variables among HCWs. The study showed that knowledge of malaria management among HCWs was found to be statistically non-significantly associated with all the sociodemographic characteristic variables with small effect sizes (**phi**) which is a measure of the strength of association.

Table 6: Relationship between Some Sociodemographic Characteristics and HCWs Knowledge of Malaria Management

Variable	Knowledge		Total (%)
	Good (%)	Poor (%)	
Age group			
≤ 30	60 (52.6)	54 (47.4)	114 (51.1)
> 30	63 (57.8)	46 (42.2)	109 (48.9)
χ^2	0.601		
p-value	0.438		
Phi	0.052		
Gender			
Male	76 (59.8)	51 (40.2)	127 (57.0)
Female	47 (49.0)	49 (51.0)	96 (43.0)
χ^2	2.619		
p-value	0.106		
Phi	0.108		
Marital Status			
Married	81 (54.7)	67 (45.3)	148 (66.4)
Unmarried	42 (56.0)	33 (44.0)	75 (33.6)
χ^2	0.032		
p-value	0.857		
Phi	0.012		
Ethnicity			
Jarawa	55 (61.1)	35 (38.9)	90 (40.4)
Non-Jarawa	68 (51.1)	65 (48.9)	133 (59.6)
χ^2	2.163		
p-value	0.141		
Phi	0.098		
Years of Practice			
≤ 5	68 (54.4)	57 (45.6)	125 (56.1)
> 5	55 (56.1)	43 (43.9)	98 (43.9)
χ^2	0.066		
p-value	0.797		
Phi	0.017		
Family Size			
≤ 10 Members	90 (58.8)	63 (41.2)	153 (68.6)
> 10 Members	33 (47.1)	37 (52.9)	70 (31.4)
χ^2	2.649		
p-value	0.104		
Phi	0.109		

Values are frequencies (percent), n = 223, χ^2 = Chi square, Phi = **Effect size (measure of strength of association)**

III.2 Discussion

The study indicated the existence of good knowledge of malaria management among 123 (55.2 %) HCWs out of a total of 223. This could be attributed relatively to increased level of training of the HCWs across the entire State by the non-governmental organizations (NGOs) in collaboration with the State agencies. The finding was a bit higher than the literature values of 41.1 % (Plateau State), 11.5 % (Ibadan), 5.6 % (Tanzania), 40.5 % (Ethiopia) and 13 % (Ghana, Laos, Senegal and Tanzania) in previous studies (Argaw, 2015; Hoffman et al., 2011; Jimam et al., 2017; Mikomangwa et al., 2019; Onyeaso & Fawole, 2007). Similarly, the finding of the study was lower than the literature

value of 85.2 % from the previous study conducted in south-east Nigeria (Onwujekwe et al., 2009).

Bivariate analysis between knowledge of malaria management and the sociodemographic characteristic variables among HCWs revealed no statistically significant association. This study was in keeping with previous study finding conducted in Karachi, Pakistan which revealed no relationship of knowledge of malaria management with the sociodemographic characteristic (age group, gender and socioeconomic condition) variables (Bilal *et al.*, 2013). This study was in contrast with a previous literature finding of a study conducted in Bahir Dar Zuria District, Northwest Ethiopia which showed that age group, educational status, family size, attitude level, and practice level were statistically significantly associated with respondents' knowledge of malaria (Dejazmach *et al.*, 2021).

IV. CONCLUSION

The study revealed that HCWs exhibit good knowledge of malaria management which was a marker of improved continuous medical education (CME) and trainings amongst HCWs offered by non-governmental organizations (NGOs) in collaboration with the State agencies. However, many HCWs with poor knowledge of malaria management still exist. The knowledge of malaria management indicated no significant relationship with the sociodemographic variables. There is therefore the need for continuous medical education among all HCWs to ensure good, effective and sustainable quality of healthcare service delivery to the populace.

ACKNOWLEDGEMENTS

We wish to acknowledge the immense contribution of Muslim for leading the team of research enumerators for the successful conduct of data collection processes throughout the study. We are thankful to all HCWs for their voluntary participation in this research work.

REFERENCES

[1] Abegunde, D., Orobaton, N., Bassi, A., Oguntunde, O., Bamidele, M., Abdulkrim, M. & Nwizugbe, E. (2016). The Impact of Integrated Community Case Management of Childhood Diseases Interventions to Prevent Malaria Fever in Children Less than Five Years Old in Bauchi State of Nigeria. PloS One, 11(2), e0148586. https://doi.org/10.1371/journal.pone.0148586

[2] Adefioye, O.A., Adeyeba, O.A., Hassan, W.O. & Oyeniran, O.A. (2007). Prevalence of Malaria Parasite Infection among Pregnant Women in Osogbo, Southwest, Nigeria. American-Eurasian Journal of Scientific Research, 2(1), 43-45.

[3] Argaw, M. (2015). Knowledge and Practice on Malaria Diagnosis and Treatment among Healthcare Providers Working in Private Health Facilities in Ethiopia: A Cross-Sectional Facility-Based Survey. MalariaWorld Journal, 6(10), 1–8.

[4] Bassey, S. & Izah, S. (2017). Some Determinant Factors of Malaria Prevalence in Nigeria. Journal of Mosquito Research, 7(7), 48–58. https://doi.org/10.5376/jmr.2017.07.0007

[5] Bilal, A., Siddiqui, W. A. & Mansuri, F. A. (2013). Knowledge, Attitude and Practice (KAP) about Malaria among Inhabitants of a Slum Area of Karachi. Annals Abbasi Shaheed Hospital and Karachi Medical and Dental College, 18(2), 79–85.

[6] Dejazmach, Z., Alemu, G., Yimer, M., Tegegne, B. & Getaneh, A. (2021). Prevalence of Malaria and Associated Knowledge, Attitude, and Practice among Suspected Patients in Bahir Dar Zuria District, Northwest Ethiopia. BioMed Research International, 2021. https://doi.org/10.1155/2021/3741413

[7] Enato, E. F. O., Okhamafe, A. O., Okpere, E. E. & Oseji, F. I. (2207). Prevalence of Malaria during Pregnancy and Antimalarial Intervention in an Urban Secondary Health Care Facility in Southern Nigeria, Med. Princ. Pract., 16: 240-243. https://doi.org/10.1159/000100399

[8] Fuge, T. G., Ayanto, S. Y. & Gurmamo, F. L. (2015). Assessment of knowledge, attitude and practice about malaria and ITNs utilization among pregnant women in Shashogo District, Southern Ethiopia. Malaria Journal, 14(1), 235. https://doi.org/10.1186/s12936-015-0755-7

[9] Hoffman, S. J., Guindon, G. E., Lavis, J. N., Ndossi, G. D., Osei, E. J., Sidibe, M. F., Boupha, B. & the Research to Policy & Practice Study Team. (2011). Assessing healthcare providers' knowledge and practices relating to insecticide-treated nets and the prevention of malaria in Ghana, Laos, Senegal and Tanzania. Malaria Journal, 10(1), 363. https://doi.org/10.1186/1475-2875-10-363

[10] Jimam, N. S., David, S. & Kaben, B. J. (2017). Comparative Assessment of Private and Public Health Care Providers' Knowledge on Malaria Treatment in Bassa Local Government Area of Plateau State. Current Medical Issues, 15(1), 45–50. https://doi.org/10.4103/cmi.cmi_40_16

[11] Malaria. (n.d.). WHO | Regional Office for Africa. https://www.afro.who.int/health-topics/malaria

[12] Mikomangwa, W. P., Kaaya, C., Kilonzi, M., Mlyuka, H., Marealle, A. I. & Mutagonda, R. (2019). Level of Knowledge among Health Care Providers on Preparation of Injectable Artesunate for Treatment of Severe Malaria in Public Health Facilities in Tanzania. BMC Research Notes, 12(1), 1–5. https://doi.org/10.1186/s13104-019-4257-5

[13] Nmadu, A. G., Sabitu, K. & Joshua, I. A. (2016). Occupational Exposure to Blood and Body Fluids among Primary Health-Care Workers in Kaduna State, Nigeria. Journal of Medicine in the Tropics, Nigeria, 18(2), 79–85. https://doi.org/10.4103/2276-7096.192223

[14] Nwanosike, D. U., Ikpeze, I. N. & Ugbor, I. K. (2015). Investigation of Malaria Prevalence and Health Outcome in Nigeria. IOSR Journal of Humanities and Social Science, 20(5): 79-84.

[15] Onwujekwe, O., Uzochukwu, B., Dike, N., Uguru, N., Nwobi, E. & Shu, E. (2009). Malaria treatment perceptions, practices and influences on provider behaviour: Comparing hospitals and non-hospitals in south-east Nigeria. Malaria Journal, 8, 246. https://doi.org/10.1186/1475-2875-8-246

[16] Onyeaso, N. C. & Fawole, A. O. (2007). Perception and Practice of Malaria Prophylaxis in Pregnancy among Healthcare Providers in Ibadan. African Journal of Reproductive Health, 11(2), 69–78. https://doi.org/10.4314/ajrh.v11i2.7928

[17] Ukpong, I., Etim, S., Ogban, E. & Abua, L. (2015). Prevalence of Malaria in the Highlands of Obudu Cattle Ranch, Nigeria. International Journal of Tropical Disease & Health, 7(3), 87–93. https://doi.org/10.9734/IJTDH/2015/14609