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STUDIES OF CO-INFECTION OF MALARIA AND HEPATITES B AMONG PATIENTS ATTENDING INNOVATIVE BIOTECH KEFFI, NIGERIA

Abdullahi, M. M.[1*] Vincent J. T.[2], Tongjura J. D.[3] and Sani, Z. R.[4]

[1, 2,3.] Department of Zoology, Faculty of Natural and Applied Sciences, Nasarawa State University, Keffi, P.M.B 1001 Nigeria.
[4] Department of Biological Science, Federal University, Gusau
Corresponding author e-mail: mairiga.nsuk.edu.ng@gmail.com

ABSTRACT
Malaria has been described as entirely preventable and treatable blood-borne mosquitos' transmittable disease. However, despite continuous global efforts at all levels of health care to achieve global control, it still remains endemic in tropical and subtropical region, though with decreasing trend (WHO, 2012; 2013). Co-infections are becoming common risk factors that may contribute to the increased burden of morbidity in Patience. The aim of this study was to assess co-infections of malaria, hepatitis B (HBV), conducted at innovative Biotech Keffi, Nasarawa State, Nigeria, from June to August 2019. A total of 200 patients were examined for malaria and HBV status. A total prevalence of 25%, 44% and 12.5% for malaria, HBV and co-infection was recorded respectively. For both sexes, age group between30 to 39 had the highest prevalence for malaria, while 20-29 had the highest prevalence for HBV. Similarly, the age group between20 to 29 had the highest prevalence for co-infection of malaria and HBV. No prevalence was recorded in age group ≤ 9 in male for malaria, HBV and co-infection. The results indicated that there was no significant difference between patients in relation to sex (P>0.05). I**t** was concluded that co-infection of malaria and HBV had effect with varying immunity in relation to age. In view of these findings, further studies involving large samples are recommended

Keywords: *Malaria, Hepatitis B virus, co- infection, prevalence and innovative Biotech*.

INTRODUCTION
Malaria is the number one killer of all the parasitic diseases. It is estimated that at least 1 million people die of malaria particularly pregnant women and children less than 5 years of age (WHO Malaria Report, 2005). More than 80% of the deaths worldwide occur in sub-Saharan Africa.
Plasmodium is a protozoan parasite that is responsible for causing malaria. Four species of Plasmodium cause malaria in humans: *Plasmodium vivax, P. falciparum, P. malariae,* and *P. ovale*. The two most common species are *P. vivax* and *P. falciparum*, with falciparum being the most pathogenic of all. Transmission to humans is by the blood sucking bite of female Anopheles mosquitoes. Human infection results from the bite of an infected female Anopheles mosquito, through which the sporozoites are injected into the bloodstream (Jawetz, 2013).
Hepatitis is an inflammatory condition of the liver and is commonly cause by a viral infection called B virus.Hepatitis B is transmitted through contact with infectious body fluids, such as blood, vaginal secretions, or semen, containing the hepatitis B virus (HBV). Other possible causes of hepatitis that occur as a secondary result of medications, drugs, toxins, and alcohol, having sex with an infected partner, or sharing razors with an infected person increase the risk of getting hepatitis B.
Co-infection of Malaria and HBV may occur in areas where both infections are endemic and because of their geographical coincidence (Freimanis *et al*, 2012; Andrade *et al*, 1984). These two infections share some of their developmental stages within the liver, which may cause an impaired clearance of the liver stages of Malaria parasites due to hepatocytes damage in HBV infection (Aernan *et al*. 2011, Thursz 1995).
Symptoms like passage of black stool, vomiting of blood; abdominal swelling may be signs of liver damage/disease which may lead to unconsciousness and later leading to death.

MATERIALS AND METHODS
Study area
This study was carried out at Innovative Biotech Keffi situated along Abuja expressway, Nasarawa State, Nigeria. Keffi local government is located between a geographical coordinates 8.8471^0N latitude and 7.8776°E longitude with an estimated area of 138km^2 and a population of 92,664 (NPC 2006).
Collection of blood samples
Whole blood was collected via venipuncture, using BD vacutainer system into K_3 EDTA anticoagulated and Tri-sodium citrate tube under strict aseptic techniques. The EDTA anticoagulated blood sample was used to analyze complete blood count while sample from the tri-sodium citrate tubes was centrifuged at 3000 rpm for ten minutes on a bench-top centrifuge in order to get Platelet Poor Plasma (PPP). The PPP obtained was transferred into sterile tube and analyzed. These samples were tested in the Haematology Laboratory. The following laboratory investigations were carried out on K^3EDTA and Citrated anticoagulated blood.
Serological examination of blood samples
The serological test of malaria parasites was conducted with a qualitative, membrane based immunoassay malaria rapid test device pre-coated with the antibody. During testing, the whole blood specimen reacts with the dye conjugate, which has been pre-coated in the test strip. The mixture then migrates upward on the membrane chromatographically by capillary action and reacts with the antibody on the membrane on the test line. If the whole specimen contains the antigen, a color line will appear in the test region. Absence of the colour line in the test region indicates that the specimen does not contain the *Plasmodium* antigen.
For the procedural control, a colour line will always appear in the control region indicating that proper volume of specimen has been added and membrane wicking has occurred (Diagen Diagnostic Reagents, 2016).

Screening of sera for HBV

Each serum sample was screened for the presence of hepatitis B by one step hepatitis B test strip (serum and plasma).

Detection for the presence of HBV virus

About 3ml of blood was collected from each patient in to a sterile blood specimen bottle. Serums were separated by centrifugation (sedimentation) at 3000rpm for 5 minutes. Each serum sample was separated from the whole blood to avoid haemolysis and screened for the presence of hepatitis B by one step hepatitis B test strip (serum and plasma).

Assay procedure for anti-HbsAg antibodies

The HBsAg one step hepatitis B test strip (serum plasma) which is a qualitative flow immunoassay for the detection of HBsAg antibodies on the test line region of the strip was used. In this, test each test strip was immersed vertically in to the serum specimen with the arrow pointing towards the serum for about 15 seconds and the test strip not immersed beyond the maximum line indicated on it. The test strip was then placed on a non-absorbent flat surface, a timer started and observation made for red lines (Cheesbrough, 2006).

Data Analysis

The results obtained were analyzed using IBM SPSS version software for the descriptive analysis. Chi-square was used to determine the level of significance between the patients.

RESULTS

The subject study was 200 patients were 133(56.6%) of the sample population were male while 87(43.5%) were female as shown in table 1.

Table 1: Distribution of patients based on gender and age group

	Number examined (n,%)		
	GENDER		
Age (Years)	Male	Female	Total
Under 9	1 (0.5)	4(2)	5(2.5)
10-19	4 (2)	5(2.5)	9(4.5)
20-29	34 (17)	29(14.5)	63(31.5)
30-39	30(15)	26(13)	56(28)
40-49	25(12.5)	14(7)	39(19.5)
50 and Above	19(9.5)	9(4.5)	28(14)
Total	113(56.6)	87(43.5)	200(100)

A total of 200 patients representing 25% of the studied population were found to be positive for malaria parasites (Table2). No significant difference (P>0.05) was observed for sex which comprises of 28 (14.0%) males and 22 (11.0%) females. Age groups 20-29 and 30-39 have the highest positive case. For both groups, 8 cases representing 3.5% of the sample was recorded while age group >50 had the least case of 1 representing 0.5%.

Table 2: Distribution of patients based on malaria positivity according to sex and age

	Malaria positive (n, %)		
	GENDER		
Age (Years)	Male	Female	Total
Under 9	0(0)	2(1)	2(1)
10-19	1(0.5)	1(0.5)	2(1)
20-29	8(4)	7(3.5)	15(7.5)
30-39	9(4.5)	7(3.5)	16(8)
40-49	8(4)	4(2)	12(6)
50 and Above	2(1)	1(0.5)	3(1.5)
Total	28(14)	**22(11)**	50(25)

χ^2= No significance difference in co-infection in relation to sex and age (P>0.05)

A total of 88 out of 200 patients studied were positive for HBV (Table 3). In both sexes, higher infection was recorded among age group 20-29 with 21 patients resenting 10.5% for male and 13 patients representing 6.5% for female respectively. Similarly, this was followed by age group 30-39. Least infection was recorded among age group ≤9, 10-19, ≥50 for female while no infection was recorded for age group ≤9 in males. Table 4 showed the distribution of patients based on Malaria/HVB co-infection according to sex and age. In both sexes, highest and similar infection rate was observed among age group 20-29. Similarly, in both sexes, no infection was recorded among the two age groups, respectively that are in age group ≤9 and 10-19 for males and age group 10-19 and ≥50 for females.

Table 3: Distribution of patients based on HBs Ag positivity according to sex and age

	HBs Ag positive (n, %)		
	GENDER		
Age (Years)	Male	Female	Total
Under 9	0(0)	1(0.5)	1(0.5)
10-19	2(1)	1(0.5)	3(1.5)
20-29	21(10.5)	13(6.5)	34(17)
30-39	17(8.5)	9(4.5)	26(13)
40-49	12(6)	5(2.5)	17(8.5)
50 and Above	6(3)	1(0.5)	7(3.5)
Total	58(29)	30(15)	88(44)

χ^2= No significance difference in co-infection in relation to sex and age(P>0.05)

DISCUSSION

Malaria and HBV infection are both endemic and life threatening diseases throughout tropical and Sub-Saharan Africa. This study presents showed a malaria prevalence of 25% among the studied population. Dabo *et al.* (2015) in his findings reported 25.5% prevalence in Kano state of Nigeria. Igwe *et al*. (2014) reported 77.6% and 30.59%, respectively of malaria prevalence in Enugu state of Nigeria.The reduction in trend as observed in this study may be due to adequate measures taken in malaria prevention and prompt diagnostic measures. In both sexes, highest prevalence was among ages 20-29, followed by 30-39.

Table 4: Distribution of patients based on Malaria/HVB co-infection according to sex and age

	Co-Infection (n %)		
	GENDER		
Age (Years)	Male	Female	Total
Under 9	**0(0)**	1(0.5)	1(0.5)
10-19	**0(0)**	**0(0)**	0(0)
20-29	**5(2.5)**	**5(2.5)**	10(5)
30-39	**4(2)**	**4(2)**	8(40
40-49	3(1.5)	1(0.5)	4(4)
50 and Above	2(1)	**0(0)**	2(1)
Total	**14(7)**	**11(5.5)**	**25(12.5)**

This corroborate the findings of Lao *et al*. (2014) which, found that HBV infection rate rose from 13.4% among individuals aged 11 to 20years to 34.9% among those aged 21 to 30 years in Pakistan. Suen *et al.* (2013) reported a case of rising prevalence of HBV infection with age among university students in Hong Kong SAR, 0.9%, 2.3%, 4.3% and 5.5% in those aged ≤ 18, 19, 20 and ≥ 21 years, respectively. These findings suggest that immunity against HBV infection was in late adolescence, which could explain the persistently high prevalence of HBs Ag carriage we observed. No infection was recorded for ≤9 in males, while only 0.5% was recorded in female. The relatively small subjects within this group could be the explanation.

Co-infection prevalence was higher for male than female. This could be due to the large male subjects in this study. Age 20-29 has the highest co-infection prevalence, followed by age 30-39. This could be due to the waning immunity among this age group.

CONCLUSION

This study demonstrated that male has higher rate of prevalence of Malaria and HBV co-infection. Also, Age group 20-29 has higher infection prevalence in both sexes. Low prevalence and in some cases no infection was observed for ≤9 age. In view of these findings further studies using larger sample size is necessary to verify the low prevalence among children.

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