Comparative Analysis on Malaria, Typhoid and Hepatitis B Virus Infections in Okigwe and Udo-Mbaise of IMO State, Nigeria

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Abstract- Comparative analysis of Malaria, Typhoid and Hepatitis B virus infections were carried out in some parts of Imo State namely; Okigwe and Udo-Mbaise using both culture and serological tests. The total of 666 patients were examined in the two locations. In Okigwe, a total number of 366 patients were examined, and in Udo-Mbaise 300 patients were examined. Malaria prevalence in Okigwe was 30(8.2%), while that of Udo-Mbaise was 40(13.3%). Typhoid in Okigwe had the highest prevalence of 56(15.3%) while Udo-Mbaise had 30(9.6%). For hepatitis, the prevalence rates were Okigwe 35(9.6%) and Udo-Mbaise 29(7.9%). In concomitant infections of malaria and typhoid; high concomitant infections was observed in Udo-Mbaise 10(2.7%). In malaria and hepatitis, Udo-Mbaise had higher infections 5(1.4%), while Okigwe had 2(0.5%). For Typhoid and hepatitis Okigwe had 8(2.2%), Udo-Mbaise had 2(0.5%). A combination of the 3 infections shows higher infection rate in Okigwe. In each of the areas examined, no gender influence was observed while age showed significant influence in malaria, typhoid and hepatitis. The most infected age group was 51-60 years, while the least was 21-30 years (P>0.05). Results showed that only few people had the three infections simultaneously. This calls for thorough or complete laboratory investigations as one infection may aggravate the other and may even occlude the other.

Index Terms- Malaria, Typhoid, and Hepatitis

I. INTRODUCTION

Plasmodium Falciparum, the causative agent of the deadliest form of Malaria (Onuigbo *et al* 2015). Malaria is an infections disease caused by protozoan parasite of the genus plasmodium. It is carried by mosquitoes and transmitted through their bite. The effect of malaria on affected humans differ according to the plasmodium species involved. In Human malaria is caused by plasmodium falciperum, P. malariae, P ovace and P Vivax P. falciperum causes the most severe effects of malaria and has the highest rate of mortality, while plasmodium ovile, P malariae and P cause milder forms of the disease. P. falciperum is responsible for about 80% of malaria infection and 90% of death in subsahara Afric (Mendis, 2001).

Hepatitis B virus infection is endemic in Nigeria and constitutes a public health menace. Despite the availability of a safe and effective vaccine against hepatitis B infection for over two decades now, the overall burden of the disease remains enormous with over two million people infected would wide and approximately one million death occur annually from HBsAg related illness. Who estimated the there are over 350 million chronic carries of HBV worldwide (WHO, 2013).

Typhoid fever is an acute, life threatening febrile illness caused by bacterium *Salmonalla enticrica* with an estimation of 22 million cases of Typhoid fever and 200,000 related death occurrence worldwide each year (Crump 2010).

Malaria, typhoid and Hepatitis B Virus infections are the major public health problems in many developing counties of the world. Like malaria and typhoid, there is a popular belief that hepatitis B surface antigen is endemic and quite prevalent in Nigeria (Nsutebu *et al.*, 2005). Patients who fail to respond to the first line treatment of malaria and typhoid usually suspect hepatitis B virus (Ohanu *et al., 2006*).

Study Area

The study area was in two locations in Imo state namely Okigwe and Udo-Mbaise, all in Imo State. Imo State lies within latitude 4^0 45'N and 7^o 15'N, and longitude 6^o 50 'E and 7^0 25' E of the equator.

Ethical Clearance

Prior to the commencement of the study, ethical clearance was sought by writing to the Chief medical Director (CMD) of Hospitals in Okigwe and Udo-Mbaise explaining the purpose of the study and seek for permission to use the health facility as well as the cooperation of their staff. On receiving approval. Officers in charge of the Laboratory section were also consulted having received approval from their CMDs.

EXPERIMENT 1: SPECIMEN COLLECTION FOR MALARIA PARASITE DETERMINATION.

The tip of the thumb was cleaned with cotton wool soaked in 70% ethanol.

With a sterile lancet, the cleanse thumb tip was pricked to obtain the peripheral blood. A drop of the blood was placed on one edge of a clear grease free glass slide. Using another sterilized clean grease free slide, the drop of blood was drown out to obtain a thin blood smear (Cheesbrough, 2005) the blood smear was allowed to air dry.

GIEMSA STAINING TECHNIQUES

Immediately before use, the giemsa was diluted by measuring 45ml of buffered water, pH. 7.1 – 7.2 in 50cl mark and mixed gently. The 10% diluted stain was poured into the staining tough. Then the smear is stained for 10 minutes. The

stain was washed off using distilled water. It was allowed to air dried. The dried smear was viewed with the x100 oil immersion objective lens of the compound microscope (Cheesbrough, 2005)

EXPERIMENT 2: SPECIMEN COLLECTION FOR TYPHOID AND HEPATITIS

3-5ml of Venous Blood of the suspect was withdrawn and put into in a clean test tube and allowed to stand for 10-15mins. This allow the blood to clot, leaving the serum on top. This serum was collected with pipette and stored at 20^0c. until required for use. (Cheesbrough, 2005).

EXAMINATION OF BLOOD SAMPLE BY WIDAL TESTING

Widal test was performed using the venous sera obtained from the suspect using widal test kit produced by (ca- test diagnostic INC China, USA).

The test identifies two types of antigens, O(somatic), and H(flagella) A drop of the serum is placed in one of the circles on the test card, as the test serum. A drop of a positive control (positive sera) and saline (Negative control) was placed on other circle on the test card, each was mixed with a drop of the commercial antigen and mixed properly.

EXPERIMENT 3: EXAMINATION OF BLOOD SAMPLE FOR HEPTITIS B SURFACE ANTIGEN USING ACON STRIP METHOD

About 1ml of serum was poured into a dried test tube. The Acon strip was dipped into the serum. (A single line on the Acon strip (manufactured by biopharm co. Ltd, Hangzou, P.R. China) shows negative while double lines shows positive). (Cheesbrough 2005)

EXPERIMENT 4: STOOL CULTURE

The stool specimens were inoculated on DCA and SSA using the streaking technique of Cheesbrough (2005), the inoculated plates was incubated at 37^0c for 24-48hrs. Observed bacterial growth was examined for specific characteristics of *Salmonella* Species with orange/pink colonies which turned black after 24hr culture. (Cheesbrough 2005).

II. RESULTS

A total of 666 patients were examined in the two Local Government for malaria, typhoid and Hepatitis B virus Infection. Table 1: Shows the age distribution of malaria, hepatitis and typhoid in Okigwe. Hepatitis having the highest prevalent of 56 (15.4%) followed by Typhoid 35 (9.6%) and the least infection was malaria with 30 (8.2%) when compared, it was statistically significant at P> 0.05.

Table 2 Shows the age distribution of malaria, hepatitis and typhoid in Udo-Mbaise Malaria having the highest prevalent of 40(10.9%) followed by Typhoid 30 (8.2%) and the least infection was hepatitis with 29 (7.9%) when compared, it was statistically significant at P> 0.05. Distribution of concomitant infections of malaria, typhoid and hepatitis B virus according to location showed that Okigwe had concomitant infection of 10,8,5,6 number of infection, malaria, typhoid, and hepatitis B virus infection, respectively Table 3. Malaria Prevent in Okigwe were 30 (8.2%) while that of Udo-Mbaise was 40 (10.9%), typhoid in Okigwe had the highest prevalence of 56 (15.3%) while that of Udo-Mbaise is 30 (8.2%). Hepatitis was more prevalence at 35(9.6%) and Udo-Mbaise had the lowest with 29 (7.9%) Table 4.

III. DISCUSSION

Although, malaria, typhoid and hepatitis B virus infection are said to be endemic in Nigeria, thus study shows that hepatitis B virus infection is far more likely to cause fever, headache, fatigue and jaundice than typhoid and malaria. Malaria, typhoid and hepatitis B virus infection are the major public problem in many developing countries of the world (Mbuh, *et al*; 2003). They are present with similar symptoms especially in their early stages (Anmah et *al*; 2003). Like malaria and typhoid, there is a popular belief that hepatitis B surface antigen is endemic and quite prevalent in Nigeria (Nsutebu *et al*., 2005).

However, this study is a comparative analysis of malaria, typhoid and hepatitis B virus infection in some part of Imo state namely: Okigwe and Udo-Mbaise.

In this study, a total number of 666 patients were examined in the two locations. In Okigwe, a total number of patients examined were 366 patients and 300 patients were examined in Udo-Mbaise. Malaria Prevalent in Okigwe were 30 (8.2%) while that of Udo-Mbaise was 40 (10.9%), typhoid in Okigwe had the highest prevalence of 56 (15.3%) while that of Udo-Mbaise 30 (8.2%). For hepatitis the prevalence was 35(9.6%) and Udo-Mbaise had the lowest with 29 (7.9%). This study is consistent with the result of Ejele *et al* (2004) who recorded 4.9 % prevalence rates in Port Harcourt while Siriena et al (2002) recorded 10.3% in Jos.

The age and gender distribution of malaria, Typhoid and Hepatitis B virus infection among the study population revealed that malaria infection in Okigwe and Udo-Mbaise in the age group of 51-60 years had the highest prevalence rate of 5(16.7%) and 5(25.0%) respectively followed by age group of 0-10 which is 2(7.4%) and 2(7.4%) respectively, while the least was recorded in the age group of 11-20years which is 2(2.9%) and 2(2.9%) respectively, P >0.05%, was considered statically significant. The malaria infection is more prevalence in age group 51-60 because they do not sleep under insecticide-treated mosquito net, that repels and /or kill mosquito coming into contact with the insecticide in the netting material. While the following age group under 10 years are infants (0-10 years) that are second more prevalent to malaria infection could be due to low immune system and low transfer maternal immune system which as a result of low transfer maternal anti body according to the report that the anti body titer were higher early in infancy and decline steadily over 0-4 months, age range and they increase steadily after four months of age conversely.

In Okigwe 35(9.8%) male tested positive to typhoid fever only, 20(5.5%) female tested positive to typhoid fever only, 13 (4.3%) male, 17 (5.7%) female tested positive to typhoid fever only in Udo-Mbaise. This can be compare with the work of Oyido *et al* (2014) who recorded 2(18.18%) among the males and 9(81.82%) among the females in Ekwulumili Community Anambra State, Southeastern Nigeria. Those within the age group of 51-60 years had the highest prevalence of

typhoid fever 5(7.2%) in Okigwe and 3(5.0) in Udo-Mbaise respectively. This is in contrast with the report of Oyido *et al* (2014), the highest prevalence seen among the age group of 51-60 years could be as a result of the individuals always in the market where they buy food from food vendors and drink any available water. Exposure to polluted drinking water, close proximity to human waste and refuse dumps, low standards of food preparation, and ignorance contribute to occurrence, prevalence and transmission of typhoid. Crump *et al* (2004).

Age and gender distribution of hepatitis B virus infection among the study population revealed that the age group of 51-60 was the most prevalent to the infection with 5 (17.7%), in Okigwe, while Udo-Mbaise had 5(50.0%). This work is consistent with the work done by Inyang-Etoh *et al* (2014), in a treatment centre in Calabar Nigeria, his result shows that, those in age group of 51-60 years had the highest prevalence rate of infection HBV. (25%). This work can also be compared with the work done by Denue *et al* (2011) at medical wards of University of Maiduguri Teaching Hospital, Nigeria on the survey of hepatitis B and C virus prevalence in HIV positive patients, who had a prevalence rate of 12.3% for HBV.

The prevalence of Hepatitis B Virus according to gender showed that Hepatitis B virus infection, were more in male 3 (10.3%), than female 2(7.4%) in Okigwe, while in Udo-Mbaise female 2(20.0%) are more infected than male 3(30.0%) but there was no statistically significant different between infection in male and female ($P>0.05$).

IV. CONCLUSION

This study revealed that malaria, typhoid and Hepatitis B virus rate among the resident of Okigwe nad Udo-Mbaise of Imo State is high. The rate of malaria, typhoid hepatitis co-infection was equally high. This observation can attributed to the wrong perception about the cause of malaria typhoid and hepatitis B virus infection.

Some people from Okigwe and Udo-Mbaise of Imo State Nigeria, drink water from the flowing streams, that serves for washing of clothes, soaking of cassava, swimming and dumping of refuses etc. if standard laboratory diagnostic center and potable drinking water can be provided to this population, malaria, typhoid hepatitis B virus infection can be reduced. Therefore presumptive treatment of fever as malaria and typhoid should be discouraged.

The findings pose great challenges to the public health in Imo state. It is therefore recommended that the local health authorities intensify efforts at sensitizing the populates of Imo state on the course of the disease and possible preventive measures.

ACKNOWLEDGEMENTS

The success of this thesis work depends on the selfless and immense contributions of the several persons. In this respect, I am mostly indebted to God Almighty for leading me till this stage I am grateful to my supervisor Prof. V. O. Nwaugo whose encouragement, untiring supervision led to the success of this thesis. I really thank my Head of Department, Dr. E. C. Onwuchekwa for his love and understanding. I also thank all of my lecturers for the knowledge they impacted to me. I am sincerely grateful to my dear husband for his moral and financial support.

I acknowledge the moral support of the following people for their concern towards the success of the thesis, Dr (Prince) Emma-Onyero JP. The medical director of God Heals Hospital Okigwe, Nwaugo Chime Vivian, all members of Onwunali and Ogwuegbu families, Bar. Lucius Nwosu (SAN), Bar. Amaechi Nwaiwu (SAN), Chigozirim and Joy (my IT students), all my course mates, especially Mr. Onuigbo Martin, my friends and well wishers for their unrelenting supports.

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TABLE 1: A AGE AND GENDER DISTRIBUTION OF MALARIA, HEPATITIS AND TYPHOID FEVER IN OKIGWE

	MALE				**FEMALE**				
AGE	**No of patients tested**	**No of patients infected with malaria**	**No of patients infected with Typhoid**	**No of patients infected with Hepatitis**	**No of patients infected with malaria**	**No of patients infected with Typhoid**	**No of patients infected with Hepatitis**	**Total No infected to all infections**
0-10	30	3 (10.0%)	2 (6.7%)	0 (0.0%)	2(6.7%)	1(3.3%)	0 (0.0%)	8(26.7%)
11-20	69	2 (2.9%)	3 (4.3%)	2(2.9%)	2(2.9%)	2(2.9%)	1(1.4%)	12(17.3%)
21-30	90	3 (3.3%)	7 (7.8%)	3(3.3%)	2(2.2%)	4(4.4%)	3(3.3%)	22(24.4%)
31-40	60	2 (3.3%)	7 (11.7%)	7 (11.7%)	2(3.3%)	6(10.0%)	5(8.3%)	29(48.3%)
41-50	30	1 (3.3%)	7 (23.3%)	3(10.0%)	1(3.3%)	3(10.0%)	2(10.0%)	17(56.6%)
51-60	27	2 (7.4%)	7 (25.9%)	3(10.3%)	2(7.4%)	2(7.4%)	2(7.4%)	18(66.6%)
61-70	60	3 (5.0%)	3 (5.0%)	2 (3.3%)	3(5.0%)	2(3.3%)	2(3.3%)	15(25.0%)
Total	366	16 (4.4%)	36 (9.8%)	20 (5.5%)	14 (3.8%)	20(5.5%)	15(4.1%)	121(33.1%)

P>0.05, was considered statistically significant

TABLE 2: AGE AND GENDER DISTRIBUTION OF MALARIA, HEPATITIS AND TYPHOID FEVER IN UDO-MBAISE

	MALE				**FEMALE**			
AGE	**No of patients tested**	**No of patients infected with malaria**	**No of patients infected with typhoid**	**No of patients infected with hepatitis**	**No of patients infected with malaria**	**No of patients infected with Typhoid**	**No of patients infected with hepatitis**	**Total No infected to all infections**
0-10	20	3 (15.0%)	1 (5.0%)	0 (0.0%)	2(10.0%)	1(5.0%)	0(0.0%)	7(35.0%)
11-20	60	6(10.0%)	1(1.7%)	2 (3.3%)	5(8.3%)	2(3.3%)	2(3.3%)	18(30.0%)
21-30	40	2 (5.0%)	2(5.0%)	3 (7.5%)	2(5.0%)	2(5.0%)	5(12.5%)	16(4.0%)
31-40	100	6(6.0%)	4(3.3%)	3 (1.7%)	5(5.0%)	4(5.0%)	5(5.0%)	27(27.0%)
41-50	60	3 (5.0%)	2(3.3%)	1(1.7%)	3(5.0%)	3(5.0%)	3(5.0%)	15(25.0%)
51-60	10	2 (20.0%)	2(20.0%)	2 (20.0%)	1(10.0%)	3(30.01%)	3(30.0%)	13(130.0%)
61-70	10	0 (0.0%)	1 (10.0%)	0 (0.0%)	0(0.0%)	2(20.0.0%)	0(0.0%)	30(30.0%)
Total	300	22 (7.3%)	13 (4.3%)	11 (3.7%)	18(6.0%)	17(5.7%)	18(6.0%)	99(33.0)

P>0.05, was considered statistically significant

TABLE 3: DISTRIBUTIONS OF CONCOMITANT INFECTION OF MALARIA, TYPHOID AND HEPATITIS B VIRUS IN THE STUDY POPULATION.

LOCATION	Malaria & typhoid	Typhoid &HBsAg	Malaria &HBsAg	Malaria, typhoid &HBsAg
OKIGWE	5	8	5	6
UDO-MBAISE	10	2	2	4

P<0.05, was considered statistically significant

TABLE 4: DISTRI BUTION OF MALARIA TYPHOID AND HEPATITIS B VIRUS IN THE STUDY POPULATIOIN

Location	No of patients tested	malaria only	typhoid only	HBsAg only
OKIGWE	366	30	56	35
UDO-MBAISE	300	40	29	30
TOTAL	**666**	**70**	**85**	**65**

P<0.05, was considered statistically significant