Prevalence Of Dengue Virus Infection Amongst Students with Febrile Illness Returning to Akanu Ibiam Federal Polytechnic Unwana

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Abstract- ***Dengue the most rapidly spreading mosquito-borne viral disease, is often mistaken to be malaria infections leading to false negative results. It could be transmitted to new places from people that have visited endemic regions. The aim of this study was to examine the prevalence of dengue virus infection amongst students with febrile illness returning to Akanu Ibiam Federal Polytechnic Unwana. A total of 150 returning students to Akanu Ibiam Federal Polytechnic, Unwana Afikpo, Ebinyi State were sampled. The virus was detected serologically using ELISA technique IgG and IgM detection. Aseptically, 5 ml of blood was collected from each patient using a sterile syringe into plain tube, the tubes were properly labeled. Field stains were prepared for malaria parasite detection using microscopy technique. ELISA technique was employed in detecting both IgG and IgM. Of the 150 samples, 43(28.7%) samples were positive for malaria. While 58(38.7%) of the samples were seropositive for dengue virus. However, 21(14%) were found to have both Malaria and Dengue virus co-infection. From Dengue Virus results of 58(38.7%), 34(58.6%) were positive for anti-DV IgM while 24(41.4%) were positive for anti-DV IgG. The highest age bracket with DV infection was among the age bracket of 17 – 22 years with 32(55.2%) infection. Co-infection showed that 12(57.1%) of the infection was also among the age bracket of 17 – 22 years. However, the highest DV infections were male 32(55.2%). From the foregoing, it is recommended that DV examination should be included in the diagnosis of people presenting with febrile illnesses.***

Indexed Terms- ***Dengue, malaria, febrile illness***

I. INTRODUCTION

Dengue is the most rapidly spreading mosquito-borne viral disease with an estimated incidence of 390 million cases yearly (Simmons *et al*. 2012, Bhatt *et al*. 2013). It is regarded as the most important arboviral disease worldwide (Gubler 2011a) and it is estimated that every year between 2.5 – 3.6 billion people in over 125 endemic countries are at risk including 120 million travelers to these regions (Gubler 2002a, Guzman and Kouri 2002). About 2 million cases evolve to dengue hemorrhagic fever and about 20,000 may culminate to death (Gubler 2002a, Shepard *et al*. 2011). The virus is a cause of serious health problems in many tropical and subtropical areas of the world. Dengue hemorrhagic fever (DHF) first emerged as a public health problem in 1954, when the first epidemics occurred in other regions of the world in the 1980s and 1990s caused by all four serotypes of Dengue virus (Nimmannitya, 2002). DHF and DSS, are major public health concerns because of their severe and often fatal disease in children as approximately 90% of DHF victims are children less than 15years of age (Magalhaes *et al.,* 2014).

Dengue virus is transmitted to humans by the bite of an infected Aedes mosquito mostly *Aedes egypti* (Kumar *et al.,* 2015). It primarily propagates in skin dendritic cells and replicate in target cells such as the monocytes or macrophages (Clyde *et al.,* 2006).

Symptoms include fever, headache, muscle and joint pains, and a characteristic skin rash that is similar to measles. In few cases, the disease progress into life-threatening DHF resulting in bleeding, low levels of blood platelets or blood and plasma leakage, or into

dengue shock syndrome where low blood pressure occurs (Wiwanitkit, 2010) and can lead to death.

The first isolated case of dengue in Nigeria was in the 1960s (Carey *et al*. 1971, Amarasinghe *et al*. 2011), but dengue is not a reportable disease in this country with most cases often undiagnosed, misdiagnosed as malaria or referred to as fever of unknown origin. Dengue IgM seroprevalence of 30.8% was reported in Nigeria among febrile children (Faneye *et al*., 2013), while another study in the north of the same country among healthy children revealed a seroprevalence of 17.2% (Oladipo *et al*., 2014). The finding from the later study needs to be interpreted with caution as it's not clear from the study when samples were collected considering it is well established that dengue IgM antibody production may last for a couple of weeks after infection (Schwartz *et al*., 2000). A recent survey of dengue IgG antibodies in Ibadan, Nigeria showed a seroprevalence of 73% among febrile patients age 4 – 82 years. A further investigation of samples for active dengue infection by Non-Structural 1 (NS1) antigen analysis revealed an NS1 seroprevalence of 35% (Oyero and Ayukekbong 2014).

This study is aimed at examining the prevalence of dengue virus infection amongst students with febrile illness returning to Akanu Ibiam Federal Polytechnic Unwana, Afikpo, Nigeria.

II. METHODS

- Study Design

This study was a cross sectional study conducted amongst returning students with febrile illness attending Medical Centre of Akanu Ibiam Federal. Polytechnic, Unwana-Afikpo, Nigeria. The virus was detected serologically using ELISA technique to detect the Immunoglobin G (IgG) and Immunoglobulin M (IgM). Dengue Virus test was done regardless of whether the patient was positive for malaria or not.

- Inclusion Criteria

All students presenting with febrile symptoms were recruited for the study.

- Sample collection

A total of 150 blood samples were collected from students presenting with febrile symptoms. Aseptically, 5 ml of blood was collected from each patient using a sterile syringe. 2 ml was put into EDTA container and the remaining 3 ml into plain tube, the tubes were properly labeled. Demographic information of each student was collected with the aid of a well-structured questionnaire.

- Analysis of Samples

Test for Malaria: The samples inside the EDTA container were used for Malaria parasite detection using microscopy technique.

- Enzyme Linked Immunosorbent Assay: The sample inside the plain tube was allowed to clot and the serum harvested for serology testing using ELISA technique. Both IgG and IgM were detected from each sample to check for both current and past infection.

III. RESULTS

A total of 150 blood samples were collected from each student presenting with fibirle illnesses.

Table 1: Distribution of Infection based on DV and Malaria

	Number of infections	Percentage (%)
DV	58	38.7
Malaria	43	28.7
Co-infection	21	14.0
Negative	28	18.7
Total	150	100

Out of the 150 samples, 43(28.7%) samples were positive for malaria. While 58(38.7%) of the samples were seropositive for dengue virus. However, 21(14%) were found to have both Malaria and Dengue virus co-infection while 28(18.7%) were negative for both dengue and malaria.

Table 2: Distribution of Dengue IgM and IgG

	Number of infections	Percentage (%)
IgM	34	58.6

IgG	24	41.4
Total	58	100

From Dengue Virus results of 58(38.7%), 34(58.6%) were positive for anti-DV IgM while 24(41.4%) were positive for anti-DV IgG.

Table 3: Distribution of infection according age group

	DV		Malaria		Co-infection	
	No.	%	No.	%	No.	%
17 – 22	32	55.2	31	72.1	12	57.1
23 – 28	26	44.8	12	27.9	9	42.9
Total	58	100	43	100	21	100

The highest age bracket with DV infection is among the age bracket of 17 – 22 years that had 32(55.2%) infection. Same age bracket had the highest in malarial infection 31(72.1%). However, co-infection showed that 12(57.1%) of the infection was also among the age bracket of 17 – 22 years (tab. 3)

Table 4: Distribution of infection according to sex

	DV		Malaria		Co-infection	
	No.	%	No.	%	No.	%
Male	32	55.2	24	55.8	15	71.4
Female	26	44.8	19	44.2	6	28.6
Total	58	100	43	100	21	100

Distribution of infection according sex indicates that of the 58 DV infections 32(55.2%) where male which is the highest while 26(44.8%) were female. Also, of the 43 infected malaria infections, the highest 24(55.8%) were male while 19(44.2%) were females. However, of the 21 co-infections the highest infected 15(71.4%) were males while only 6(28.6%) were females (tab. 4).

IV. DISCUSSION

The present study discussed the prevalence of dengue virus infection amongst students with febrile illness returning to Akanu Ibiam Federal Polytechnic, Unwana – Afikpo. Of the 150 samples collected, 43(28.7%) samples were positive for malaria. While 58(38.7%) of the samples were seropositive for dengue virus. However, 21(14%) were found to have both Malaria and Dengue virus co-infection while 28(18.7%) were negative for both dengue and malaria.

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Based on the presented results, it is not surprising that many people have been suffering of false negative result as they have been diagnosed on malaria instead of dengue because they showed signs of malaria. This cannot be unconnected with lack of awareness on the possibility of dengue infection. Our assumption is in line with the assertion of Adenola *et al.* (2016), when they noted that although there have been many reports of isolated outbreaks of dengue infection in Nigeria after 1960, it is likely that many outbreaks of dengue may have been neglected, under-recognized or under-reported due to a lack of awareness of health staff and unavailability of diagnostic tools in health institutions. The reason for misdiagnosis must also not be unconnected with the fact that malaria and DV share similar symptoms. Our position is once again in line with the views of Baba *et al.* (2009), when they remarked that Malaria, DEN and CHK share common symptoms such as sudden high fever, headache and joint pain among others. In most Sub-Saharan countries including Nigeria, malaria is commonly attributed to all febrile illnesses (Baba *et al.*, 2009). This position was concluded when Mohammed *et al.*

(2013), observed that due to this similarity and lack of specificity of symptoms, misdiagnosisis often common among clinicians. Misdiagnosis is more probable when these infections occur simultaneously. This simultaneous occurrence is in line with the result of the present study.

CONCLUSION

Dengue virus and malaria parasite infection present with similar symptoms and are most times misdiagnosed leading to false diagnosis. This misdiagnosis has led to abuse of antimalaria drugs as the patients may be assuming that the parasite probably is resistant to the antimalaria drugs being used not knowing it is a viral infection. To this end, there is need to include degue fever diagnosis when requesting for clinical investigation on people presenting with febrile illness. Schools should include screening of returning students for dengue and malaria infections to reduce the rate at which students fall sick with delayed recovery.

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