SJIF Impact Factor: 5.464

WORLD JOURNAL OF ADVANCE HEALTHCARE RESEARCH

ISSN: 2457-0400
Volume: 4.
Issue: 4.
Page N. 23-25
Year: 2020

Original Article www.wjahr.com

EVALUATION OF SEASONAL PATTERN OF INFECTION IN DRY AND RAINY SEASONS OF 14 MONTHS EACH

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Received date: 07 May 2020 **Revised date:** 28 May 2020 **Accepted date:** 18 June 2020

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ABSTRACT

A parasitologic evaluation of blood samples of 2000 symptomatic malaria patients (1000 males and 1000 females) in some health facilities of Enugu metropolis was conducted to determine the seasonal pattern. The blood was evaluated parasitologically. For seasonal pattern, 830 (67.9 percent) was recorded to coincide with rainy seasons while 390 (50.1%) was recorded in dry seasons. A prevalence of 880 (88.0%) was recorded in males and 340 (34.0%) in females.

INTRODUCTION

Four parasitic protozoa of the genus *plasmodium (P)* which include *P.* ovole. *P.* vivax *P. malariae* and *P* falciparum cause human malaria. *Plasmodium* falciparum cause the most severe morbidity and mortality, are found throughout tropical Africa, Asia and Latin America (Nwoke *et al.,* 1993). All the four species are transmitted to man through the bite of an infected female. *Anopheles* mosquito species of gambiae *complex*, funestus *and* darling (Okoro, 1993[(]). Other less common routes of infection are through blood transfusion and Maternal-fetal transmission. Malaria remains an enormous international medical issue, being one of the commonest, oldest and extensively researched tropical diseases of our time, with high morbidity and mortality rates. Globally, 300 - 500 million deaths occur annually. Ninety percent of deaths each year come from rural Sub Saharan African (Fernandez and Bobb, 2001). Complications of malaria include cerebral malaria, pulmonary oedema, rapidly developing anemia, vascular obstruction. Black –water fever, hyperpyrexia, algid malaria, severe gastroenteritis, nephritic sydrome, tropical splenomegaly and low birth weight in babies whose mothers have heavy malaria parasitization of the placenta (Ekanem, 199I), There is increasing resistance of parasite species to some of the existing drugs (Barat and Bloland, I997). Drug resistance stresses the loss of response of parasite to the effect of the active compound. Then, effectiveness of the drug on the parasite depends on the parasitaemia and the status of the host's immunity. At this juncture, there is an intermittent rise in temperature as the new generations of merozoites are liberated into the blood stream. It is characterized clinically in malaria by paroxysms of cold stage (rigor and chill), hot stage (pyrexia or high fever) and sweating stage (defervescence).

In fact, the management of malaria infection becomes a major challenge to public health especially with the emergence of chloroquine resistant plasmodium faciparum (CRPF) malaria (Umotong *et al*., 1991., Esimai and Njioku, 1994).

The study aimed at determining the seasonal pattern of infection,

MATERIALS AND METHODS

Study Area

The study was carried out in Enugu, the capital of Enugu State.

Study population

Study population comprised of all the inhabitants of Enugu metropolis who attended the five major hospitals and three health centres. The Hospitals included National Qrthopaedic Hospital (N.O.H), University of Nigeria Teaching Hospital (UNTH), mother of Christ Hospital, Park-lane Hospital and Colliery Hospital merged with the Health Centres were used as one hospital collection centre for adequate collection of sample. Health Centres used, included Obodonike Emene Health Centre, Ugbohe Health Centre Abakpa Nike, and Obegu Amuam Ugwuaji Health Centre.

Sample population
Samples were taken from 2000 patients of both children, adults, males, females and pregnant women. They comprised of 1000 males and females with age-range, 0-60 years. Four hundred samples were collated from each hospital location.

METHODOLOGY
Between March 2000 and June 2002, a paraitologic evaluation of blood sample collected from 2000 patients (1000 males and 1000 females) presenting with clinical malarial symptoms was carried out to determine the presence of *plasmodium* infections on patients who a tended the target health facilities. All ages whose request forms indicated by the doctor, 'examination for malaria, were sampled. Examinations were conducted for 14 months of dry and rainy seasons each.

Sample collection
Permissions were requested from the doctors, nurses, health workers and medical laboratory scientists in the health-facilities to carry out the study. The consent of the patients was also solicited most collections were carried out at the laboratory section of the hospital. Study areas were visited repeatedly on regular basis for collection of simples.

Constraints were mostly on transportation due to increase in fuel pump price and fuel scarcities. It involved hiring of taxis, joining buses for intra-city movements, and sometimes it led to trekking. With heavy down pours experienced during the rainy seasons, collections of sample were carried out most judiciously and with great commitments.

Laboratory Investigation
With sterile lancet, blood was collected from the ball of the third finger expressing the first drop of blood after cleaning with 70% alcohol. Thick and thin films were prepared and stained with 10% Giemsa solution for microscopical examination (Field, 1973). The presence of parasites and species were identified.

Adequate records were maintained for data analysis. Patient's name, number, sex, age, address, location of sample collection, period of season collected, date and result were noted. Data entry, coding and tabulation were carried out, using computer to maintain adequate record for each sample tested.

Parasitologic Procedure
Thick films were made and stained with 10% Giemsa solution in buffered distilled or deionized water, pH 7.2 for 5-10 minutes.

Gently, the stain was flushed off to avoid deposit of scum over the film. Parasites count on thick film was based on the number of parasites per ml of blood or per 200 white blood cells. These were counted in relation to a predetermined number of leukocytes. An average of 8,000 Leukocytes per ml was taken as standard, despite inaccuracies due to variation in the number of leukocytes in animal model, in normal health, and greater variation in ill-health. The equivalent of 0.025ml of blood (25 per microlitre) about 100 fields and using x 7 occular, and X 100 oil immersion objective, the number of parasites were determined. The parasite per ml or parasitaemia was noted by simple mathematical formula (WHO,1983).

$$\frac{\text{No. of parasite counted x 8.-000}}{\text{No. of Leukocytes counted}}$$

RESULTS

Prevalence on seasonal *plasmodium* of infections, showed that in dry seasons of the years between 2000 and 2002, the months of November were recorded with the highest prevalence of 82.4% and 74.6%, while in rainy seasons, the months of June had the highest prevalence of 78.0%,87.3% and 80.0% (Table 1). In fact a prevalent of 50.1% was recorded in dry seasons while 67.9% in rainy seasons of all positive symptomic patients (Table 1).

Table 1: Seasonal pattern of infection in dry and rainy seasons of 14 months each.

Year	Month	No Examined	No Positive	Percent (%) per month	Year	Month	No Examined	No Positive	Percent Positive per month
	March	27	14	51.8		May	74	53	71.6
	April	75	42	56.0		June	82	64	78.0
2000	Nov	34	28	82.4		July	99	68	68.6
	Dec	64	32	50.0	2000	Aug	89	62	69.6
	Jan	73	29	39.7		Sept	110	80	72.7
	Feb	44	20	45.4		Oct	90	50	55.5
	March	38	23	60.5		May	68	36	52.9
2001	April	28	20	71.4		June	79	69	87.3
	Nov	83	62	74.6	2001	July	92	57	61.9
	Dec	95	34	35.7		Aug	82	50	60.9
	Jan	73	27	36.9		Sept	120	75	62.5
	Feb	58	22	37.9		Oct 2002	82	60	73.1
2002	March	48	17	35.4		May	70	38	54.2
	April	38	20	52.6		June	85	68	80.0
Total		778	390	50.1	Total		1222	830	67.9

DISCUSSION

The study showed that malaria is a worrisome disease as the infection was recorded all year round. A high prevalence of 67.9% was recorded to coincide with the rainy season, confirming the work done by Okoyeh, *et al*. (1994) that the peak transmission in the tropics coincided with the rainy season May –October. The study revealed that other ailments can manifest or precipitate signs and symptoms of malarial infection, since not all the patients who presented with clinical symptoms of malaria were positive to the infection. Therefore, proper investigation of this should not be overemphasized.

Plasmodium falciparum was found quite predominant in the study population. P. falciparum is known to cause a much more dangerous disease than the other species. It was recorder to be responsible for 90% of all malarial infections in Africa, most especially in rural sub-sabaran Africa (Fernanda and Bobb, 2001). It was noted as a cause to majority of deaths worldwide (Awa, 1991). P. malariae was found less common in the study population.

With the emergence of Chloroquine Resistant Plasmodium falciparum (CRPF) malaria, treatment has become a very big public health problem.

CONCLUSION

Malarial infection is recorded all year round, and increase in transmission, coincides with the rainy seasons. There is a need for urgent treatment of malaria as an underlying ailment in patients from endemic regions because of the prevalence of the positive patients.

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