EUROPEAN JOURNAL OF BIOMEDICAL AND PHARMACEUTICAL SCIENCES
http://www.ejbps.com

ISSN 2349-8870
Volume: 7
Issue: 7
96-99
Year: 2020

DETERMINATION OF AGE PATTERN OF INFECTION AMONG THE STUDY POPULATION IN DRY AND RAINY SEASONS IN ENUGU METROPOLIS

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Article Received on 08/05/2020 **Article Revised on 29/05/2020** **Article Accepted on 19/06/2020**

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 prevalence of plasmodium (P) species, seasonal pattern; sex and age specific pattern with special reference to pregnant women. The blood was evaluated parasitologically. The study revealed higher prevalence of malaria in rainy season than dry season. In the rainy season, persons within 51-60 years had the highest prevalence of malaria (96.9%) followed by 0-10years with (80.0%), 21-30 years, (74.0%), 41-50 years (71.0%), 11-20 years (67.5%) and 31-40 years (54.6%). Children and the aged persons were found to be more predisposed to malaria infections. Their susceptibility could be attributed to decline in their immune status. For dry season, those within 31-40 years had the highest prevalence (72.9%) followed by 21-30 years (67.0%), 11-20 years (50.4%), 41-50 years (24.5%), 51-60 years (17.4%) and 0-10 years (7.5%). The reduced prevelence among the children and aged persons could be due to preventive measures. Highest prevalence in young adults could be due to extent of exposure to the breeding sites of mosquitoes due to occupation and hyperactivity.

KEYWORDS: Age Pattern, Malaria Infection, Dry and Rainy Seasons, Enugu Metropolis.

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, cf. 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). All ages are affected. Malaria contributes to maternal deaths. 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. Moreover, it is conceivable that some nutritional and other factors in the host play an important part in the response of the parasite to the drug (WHO, 1965). Stress condition enhances relapse of latent inhibited malaria parasites in the state of depressed immune system or by a failing off in immunity brought on by physiological shocks as in exhaustion, childbirth, operations and many other conditions (Broun, 1969).

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., Ezedinachi, et. al.1991., Esimai and Njioku, 1994). The search for some means to reduce the scourge becomes

imperative, and this attracts a global fight from the project on rolls back malaria (RBM) by WHO.

MATERIALS AND METHODS

Study Area

The study was carried out 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 Obagu Amuam Ugwuaji Health Centre (fig. 6).

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, collection 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 laukocytes 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

Statistical analysis by chi-square test showed a highly significant difference ($p < 0.000\ 1$) in the number of humans infected in dry season when compared to the number infected in rainy seasons (Table 1).

Age specific pattern of plasmodium infections per age group examined, snowed that age-group 21-30 years ranked highest with a prevalence of 450 (71.9%), while the group 51-60 years had the lowest prevalence of 44 (43.1%) (Table 2). There was a high prevalence of infection recorded in all age groups during the rainy seasons.

Table 1: Age pattern of infection among the study population in Dry and Rainy seasons.

Age-group (in year)	Season					
	Dry Season			Rainy Season		
	No Examined	No infected	Percent infection per age-group	No Examined	No Infected	Percent Infection per age group
0-10	53	4	7.5	55	44	80.0
11-20	115	58	50.4	157	106	67.5
21-30	191	128	67.0	435	322	74.0
31-40	211	154	72.9	359	196	54.6
41-50	139	34	24.5	183	130	71.0
51-60	69	12	17.4	33	32	96.9
Total	**778**	**390**	**50.1**	**1222**	**830**	**67.9**

X^2 =49.3,df=5,p<0.0001

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 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.

The study revealed higher prevalence of malaria in rainy season than dry season. In the rainy season, persons within 51-6- years have the highest prevalence of malaria (96.9%) followed by 0-10 years, 21-30 years (74%), 41-50 years (71%), 11-20 years (67%) and 31-40 years (54%). This shows that the aged persons and children are more predisposed to malaria infection may due to decline in immune status. For dry season those within 31-40 years have the highest prevalence (72%) followed by 21-30 years (67%), 11-20 years (50.4%%), 41-50 years (24.5%), 51-60 years (17.4%) and 0-10 years (7.5%). This reduced prevalence among the children and the aged persons could due to preventive measures and extent of exposure to breeding places of mosquitoes due to the hyperactivity of the young adults in their occupations.

In the study population, all age-groups were affected, but a high prevalence was recorded in age-group 21-30 years. These are very active age-group who are faced continually with hyperactivity, stress condition, and exhaustion which could also lead to a falling off in immunity. Most people in this age-group may not have had fresh infected mosquito bite, but the lately inhibited parasites in the body may become active due to depressed immunity, and cause infection.

CONCLUSION

The prevalence of Plasmodium infection and continual spread of chloroquine resistant strains should necessitate taking a step into orthomolecular approach with free-radical concept for the management of Plasmodium infection. The study revealed higher prevalence of malaria in rainy season than dry season. In the rainy season, persons within 51-6- years have the highest prevalence of malaria followed by 0-10 years. This shows that the aged persons and children are more predisposed to malaria infection may due to decline in immune status. For dry season those within 31-40 years have the highest prevalence followed by 21-30 years This reduced prevalence among the children and the aged persons could due to preventive measures and extent of exposure to breeding places of mosquitoes due to the hyperactivity of the young adults in their occupations. The age differences of the population should be considered during control of malaria in this part of the world.

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