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Prevalence of malaria among infants 0-5 years in a Rural Community South Eastern Nigeria

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ABSTRACT:
This study was designed to investigate the prevalence of malaria infections among infants aged 0 to 5 years in Obowo local Government Area, Imo State Southern Eastern Nigeria. Blood was collected from the infants also a structured questionnaires were distributed to ascertain their villages, age, sex, parental occupations and mosquitoes preventive methods before recruiting them into the study. Overall, 86 (57.3%) of the 150 children investigated were found to have malaria infection. Children between the ages of 0 and 1 years had the highest prevalence of plasmodium infections 45.3% compared with the other age groups. Plasmodium infections were commoner in the male than in the female subjects. Children of Traders was observed to have a higher prevalence of 30.2% compared to other parental occupations. Only 22.0% used insecticide treated mosquito nets while 24.0% of the parents spray insecticides to prevent mosquito bites. There is therefore need for more awareness on effective use of drugs and Insecticide Treated bed nets in malaria hyper endemic regions.

Keywords: Prevalence Infants Malaria

INTRODUCTION:

Malaria is the most prevalent tropical disease in the world today. Each year, it causes disease in approximately 650 million people and kills between one and three million, most of them, young children in Sub-Saharan Africa (Hay *et al*., 2004). Nigeria is known for high prevalence of malaria and it is a leading cause of morbidity and mortality in the country. Available records show that at least 50 per cent of the population of Nigeria suffers from at least one episode of malaria each year and this accounts for over 45 per cent of all out patient visits (Ojurongbe *et al.,* 2007). Malaria infection during the first five years of life is a major public health problem in tropical and subtropical regions throughout the world (Trampuz *et al*., 2003) and (Greenwood *et al.,* 2005). The disease accounts for 25 per cent of infant mortality and 30 per cent of childhood mortality in Nigeria thereby imposing great burden on the country in terms of pains and trauma suffered by its victims as well as loss in outputs and cost of treatments (Ogungbamigbe et al., 2005). Malaria causes widespread anemia during a period of rapid brain development and also direct brain damage and this neurologic damage results from cerebral malaria to which children are more vulnerable (Boivin, 2002). Over the longer term, developmental impairments have been documented in children who have suffered episodes of severe malaria (Trampuz *et al*., 2003). Many children who survive an episode of severe malaria may suffer from learning impairments or brain damage. Pregnant women and their unborn children are also particularly vulnerable to malaria, which is a major cause of prenatal mortality, Low birth weight and maternal anaemia (WHO/RBM, 2003). It is estimated that 60 million Nigerians experience at least two episodes of malaria attack every year.

MATERIALS AND METHODS:

Study area:
This study was carried out in Obowo Local Government Area of Imo State, South East Nigeria. The geographical coordinates of the area is Latitude $5^{0}10^{1}$N-$5^{0}5^{1}$N and Longitude $6^{0}35^{1}$ E-$7^{0}28^{1}$ E. It has an area of 198 km^{2} and the vegetation characteristics are tropical rain forest. It experiences a moderate rainfall, with an annual rainfall of 1500mm and average minimum temperature of 20˚C. It has two distinct seasons; wet and dry season. The major occupation of the people is farming which is done

at subsistence level. Also they produce good quantity of vegetable, palm oil, kernel, broom (local ones) and baskets. Some of the people also embraced small scale trading and fishing. Their houses are made of brick walls with corrugated metal sheets roofs, few live in mud houses with thatched roofs (Iwunze et al., 2019). Source of water in these area include village stream, boreholes and roof catch water which are stored in buckets, cans etc. Refuse and materials like discarded plastic cans are heaped around houses, schools, roads, and market square. These causes flood during rainfalls and contribute to the breeding of mosquitoes leading to high malaria transmission rate and prevalence (WHO, 2005).

Ethical Considerations:

Ethical clearance and permission was obtained from the Post Graduate Research Board of Zoology Department of Imo State University, Owerri, Nigeria. Consent was sought and obtained from the health centre. Informed consent was also obtained from the mother of the infants.

Data Collection:

Data collection includes blood collection and questionnaire administration. Blood samples of 150 Infants were collected by venipuncture based on their mother's consent. Blood samples were collected using (SWAB), cotton-wool dipped in 70% alcohol, tourniquet and disposal lancets which was used for thick blood smears.

Processing of Specimen:

Malaria was diagnosed microscopically by staining thick and thin blood films on a glass slide to visualize malaria parasites. These stains include Gilems, Wright's or field's stain.

Data Analysis:

Data obtained were analyzed manually using percentages. Variables of interest were tested using Chi square statistical analysis at confidence interval of 95% (P=0.05).

RESULTS:

The study was carried out in Obowo Local Government Area. Table 1 shows that out of the 150 infants were tested for malaria, 64 were Negative while 86 were positive (57.33% and 42.66%) respectively. Statistical analysis shows a significant difference (P<0.05). Table 2 showed that infants of age bracket 0-1 had the highest prevalence of 45.3% followed by 2-3 years (30.2%) and 4-5 years with the lowest prevalence of 57.3%. Statistical analysis shows that there is a significant difference between age group and infection rate. Sex related prevalence (table 3) showed that the male (65.1%) were heavily infected compared to female (34.8%). Statistical analysis shows that there is a significant difference between age group and infection rate. Prevalence in relation to occupation (table 4) showed that infants whose parents are traders recorded the highest prevalence of 30.2% followed by artisans (27.9%), farmers (22.0%) and civil servants. Statistical analysis shows that there is a significant difference between age group and infection rate. Table (5) showed that infants who uses window/door nets as a preventive method recorded the highest prevalence of 27.3% followed by insecticides(17.3%) and mosquito repellent with the least prevalent of 9.3%. Statistical analysis shows that there is a significant difference between age group and infection rate.

Table 1. Overall prevalence of malaria in the study area.

Villages	No examined	Overall prevalence (%)
Number Infected	86	57.33
Number not infected	64	42.66
Total	**150**	**100.00**

Table 2: Age related prevalence of malaria in infants in the study area

Age	No examined	No infected	Prevalence
0-1	60	39	45.3
2-3	56	26	30.2
4-5	34	21	24.4
Total	**150**	**86**	**57.3**

Table 3. Sex related prevalence of malaria in infants in the study area

Sex	No examined	No infected	Prevalence
Male	91	56	65.1
Female	59	30	34.8
Total	**150**	**86**	**57.3**

Table 4. Occupation related prevalence of malaria in infants in the study area

Occupation	No examined	No infection	Prevalence
Traders	48	29	30.2
Civil servants	36	14	16.2
Farmers	27	19	22.0
Artisans	39	24	27.9
Total	**150**	**86**	**57.3**

Table 5. Distribution of malaria parasite according to mosquito prevention method of malaria in the study area

Preventive method	No respondent	Prevalence
Bed nets (ITN)	33	22.0
Insecticide	36	24.0
Mosquito repellent	14	9.3
Window/door nets	41	27.3
None	26	17.3
Total	**150**	**57.3**

DISCUSSION:

Malaria remains one of the world's greatest childhood killers and is a substantial obstacle to social and economic development in the tropics. *Plasmodium falciparum* infection is the major cause of morbidity and mortality especially among the vulnerable groups to which children, especially aged less than 5 years belong (Idro *et al., 2007*). In this study the prevalence of malaria in infants between 0 and 5 years is 57.3%. This is in agreement with the findings of other workers in malaria endemic countries (*Aribodor et* al., 2003 and Sotimehin *et al.,* 2008). However, this finding was lower when compared to 80% malaria parasite prevalence reported among school children in the malaria-endemic village of Erunmu in southwest Nigeria (Adefioye et al., 2007). The high prevalence could be due to the fact that this study was conducted just before the onset of rains till the end of raining season also the study was carried out in a tropical rainforest zone and the study revealed that malaria was prevalent during the rainy season in the area between the months of October and November. Rainfall is known to increase the prevalence of malaria since it provides more breeding sites for the vector of malaria (Ani, 2004). This period has been marked as a period of high transmission.

It was observed that newborns and infants between age 5 days and three months who presented with fever were found to be positive for malaria. Similar observations have been reported in endemic and hyper endemic areas (Sotimehin *et al.,* 2008 and Kakkilaya, 2006) where it was found that the parasite rate increases with age from 0-5% in the first three months of life to 80 to 90% by one year of age and the rate persists at a high level during early childhood. The presence of malaria parasites in the blood of newborns may be as a result of congenital malaria as reported by Sotimehin *et al*. (Sotimehin *et al.,* 2008). Congenital malaria, defined as the presence of malaria parasites in the erythrocytes of newborns aged <7 days, was considered rare in endemic areas until recent studies started reporting high prevalence rates (Sotimehin *et al.,* 2008). The high prevalence rate in the study area could result to childhood anaemia and other severe conditions such as cerebral malaria as reported by other workers (Trampuz *et al.,* 2003).

In this study, it was found that children between the ages of 0 and 1 years had the highest prevalence of plasmodium infections compared with the other age groups. This may be due to the fact that at that age, their immunity to parasitic infections has not been fully developed as pointed out by (Katrin, 2009). This observation was in line with reported high prevalence of Plasmodium infections in younger children as reported by Ani, (2004). Who asserted that prevalence of parasitic infections has been found to reduce with age. A similar trend was also observed for children in Awka (Mbanugo and Ejims, 2000) and coastal dwellers of Lagos State (Nebe et al, 2002).

The present result conforms with the recorded higher prevalence of Plasmodium infection in male than in female school children as reported by Ani (2004). The higher prevalence of Plasmodium infection in males than

in females may be attributed to the fact that males expose their bare bodies more than females especially when the weather is hot. Thus, such males are more likely to be bitten by mosquitoes. Females, on the other hand, are usually not exposing most parts of their bodies and tend to stay indoors, helping out with household chores. This reduces their contact with the mosquito vector as pointed out. Also, studies have shown that females have better immunity to parasitic diseases which is attributable to genetic and hormonal factors (Zuk and Mckean, 1992). This issue is highly contestable because at this age of children under this present study, hormonal influence is not marked.

Prevalence in relation to the occupation of the parents of the infants showed that infants whose parents were Traders recorded the highest prevalence rate of (30.2%) compared to others with Civil Servants having the least prevalence of (16.2%).

Following the demonstration that vector control measures can substantially reduce malaria transmission, malaria morbidity and all-cause child mortality, it has been suggested that insecticide-treated materials (ITMs) may also curb the spread of antimalarial drug resistance (Diadier *et al.*,). There is a significantly low prevalence rate of malaria (22.0%) among the children that used Insecticide Treated Nets, although only 18% of the sample population used Insecticide Treated Nets (ITNs). Majority of households do not prevent mosquito bites and disease transmission in any way and a high prevalence rate of 17.3% recorded among this group of children. There is therefore the need to intensify awareness and education and to make the ITNs available at affordable prices in these malaria hyper endemic areas as the use of insecticide-treated nets decreased the number of malaria cases in children. However, the community and the producers of these indigenous herbs need to be educated on strict adherence to environmental hygiene. There is also urgent need to encourage and empower researchers to identify the active ingredients in the effective local herbs for mass production. These may eventually lead to drug discovery in the bid to eliminate malaria. Therefore, it is necessary to collect reliable data on the malaria burden in this population. Awareness by health professionals should increase so that any infant aged under 6 months brought to a health facility in a malaria-endemic area with unexplained fever or suspected sepsis should be systematically screened for malaria. Current policy for malaria diagnosis dictates that all fevers in all age groups and settings should be tested for malaria before treatment is initiated.

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