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Full Length Research

The intensity of malaria infection among cattle herdsmen in a secluded area of Okada community, South-South, Nigeria

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Malaria intensity study was undertaken in a remote camp / settlement, predominantly inhabited by some cattle attendants /husbandmen, within the early and intense periods of the rains. Fiftynine(59) persons in which malaria parasites were found in their blood microscopically examined, were counted as positives. Age structure of the study population showed that persons under 20 years of age (N=18;34.6%) were less in number than the participants whose ages range from 20 years and above(N=34;65.4%). Gender consideration showed more male participants (51.9%) than the females (48.1%). The intensity of malaria parasites was determined by standard formula for malaria parasitaemia. The overall malaria parasite count per 100 white blood cells and parasite density per microliter of blood respectively were 5219/100WBC and 414,700/µl. The highest parasite count occurred in childrenwithin the age of 5 to 9 years. Children had more malaria parasite density per microliter of blood as compared with the adults. A negative correlation was established between age and malaria parasite density (P< 0.05). By comparing the parasite load in both sexes, there was a total of 323,760 MP/µl in the females while the difference (90,940 MP/µl) was observed in the males. In all the age groups, parasite densities were more in the females. Parasite distribution among the gender groups showed that male and female children of the 5-9 age category had the most malaria parasite relative to the others. Poor socioeconomic conditions, illiteracy and favorable breeding environment for Anopheles mosquitos were major factors responsible for the high malaria status in the settlement.

Key words: Malaria, Hausa community, intensity, microscopy, parasites.

INTRODUCTION

Malaria disease is a public health burden and of great socioeconomic importance. The knowledge of malaria dates back into the history of the human race and had been recorded since the ancient times (Okafor, 2005; Singh and Saxena, 2002). The global status of malaria reflects the actual situation around the world (Hartl, 2004).

It is endemic in about 102 countries of the world in which over 2.1 billion (41%) people are infected annually (WHO, 1999). The world health organization reported that over 90% of malaria occur in Africa South of Sahara.

Mortality due to malaria has been estimate to fall between 700,000 to 3 million and the spread of as well as the intensity are encouraged by conditions that promote its transmission (CDC, 2018).

In Nigeria, malaria burden is reportedly high with many casualties (Salwa et al., 2016; Dawaki et al., 2016). Malaria causing parasites are capable of invading important organs in the body and prolonged infection can be life threatening (Okafor- Elenwo and Elenwo, 2014).

The risk factor for the infection include living in malaria endemic area, exposure to infected female anopheles mosquitoes, filthy environment, low immunity, socioeconomic backwardness, etc. Immunity to malaria is however, marked by gradual decrease in the frequency and severity of the disease (WHO, 1999).

Due to favorable ecological conditions, which sustain for the breeding and survival of the mosquito, vector of

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Plasmodium sp, the prevalence and intensity of malaria remains high (Singh and Saxena, 2002). The diagnosis of malaria should be prompt for early commencement of treatment to avoid the infection severity (CDC, 2018).

Microscopy of stained blood films (thick and thin), is widely accepted for the diagnosis of malaria parasites and is the method adopted in this study. The slides, in which malaria parasite infective stages were identified, were counted as positives. For most malaria prevalence studies, as well as the determination of parasite density, microscopy appears to be the best choice (Okafor, 2014; Ruqayyah et al., 2017; Atef, 2019).

This study was aimed at assessing the intensity of malaria in a section of Okada community, called Hausa Camp. It determined the parasite density and severity of the infection in the infected individuals, from different age categories.

MATERIALS AND METHODS

Okada is the head quarter of Ovia North East Local Government Area of Edo State, Nigeria. It has a wide area of 2301 km and a population of over 300, 000 people. The local /indigenous inhabitants of the area are mainly subsistence farmers and petty traders. Okada has many farm settlements, inhabited by people from different ethnic groups in Nigeria. The environment of the community maximally supports the rearing of livestock as well as chickens, goats, sheep and to a large extent, cattle. The attendants to these animals settle in swampy camps in the forest with their families for the purpose of rearing their animals. The children (both sexes) from four years and above, lead the animals round the bush for grazing on grasses as early as 8.00am, while the older ones join them from 11.00 am. By 6.00-6.30 pm, they return the animals to their settlements. Their women trade mainly on unpasteurized fresh cattle milk.

Sample collection

Fifty nine blood samples were collected from cattle herdsmen resident within small camps in Okada community. The blood samples were collected aseptically following standard procedures using sterile syringes and needles by trained medical personnel. About 4 ml of venous blood was collected from each participant into ethylene-diamine-tetra-acetic-acid (EDTA) as described by Moody (2002). The Malaria parasitaemia (Mp) was determined by microscopic examination of Geimsa-stained thick-film method. For a (20-30) min staining procedure, about 3% solution of Giemsa-stain was prepared, by adding 1.5 ml of Giemsa stain by means of a dry-graduated-plastic-bulb pipette, to 50 ml of buffered water (of pH: 7.2) (Okhamfe et al., 2007).

The total white blood cells count was also determined using white blood cell count dilution solution and improved Neubauer counting chamber to quantify the number of leukocytes present in all the blood samples collected as described by Atef (2019).

RESULTS

The study participants whose blood samples were confirmed to be positive for malaria parasites were used for this study. Fifty-two of them were randomly selected across different ages (1 and 81 years) and sex. Age structure of the population examined showed that the participants from ages 20 and above (20+) were comparatively more than the ones of other age groups. For the age groups under the age of 20 years, those in the age bracket of 0-4 years, were more in number (N=;14.8) than the other children (Figure 1).

Males were higher than their female counterparts in 0-4 years age group, 10-14 years and 30 years and above. In general, the male total percentage of males who were examined (51.9) were more than the females (48.1) (Figure 2).

The overall malaria parasite count per 100 white blood cells and parasite density per microliter of blood respectively were 5219/100 WBC and 416,800/µl. When considered according to the ages of the examined groups, the highest parasite count occurred in children in the age 5 to 9 years (Figure 3). Of the individual groups, the 15-19 years age group had less than 100 average malaria parasite count per 100 WBC. Children had more malaria parasite density per microliter of blood as compared with the adults. A negative correlation was established between age and malaria parasite density ($P< 0.05$) (Figure 4).

The parasite load in the females of all the age groups (323,760 MP/µl) were observed to be much more higher than those of their male (90,940 MP/µl) counterparts (Figure 5). The young female children in the age group of 5-9 years had the highest parasite density with an average total malarial parasite density of 108,640 (Figure 6). The nearest to it was 49280 MP/µl from the 20-24 years age bracket, giving a clear difference of 59,360 MP/µl. In the males, similarly, ages 5-9 years had more parasite density (40000) while it was low for the 10-14 years (460 MP/µl).

DISCUSSION

The present study examined the intensity of malaria parasites in some individuals in Okada community. The variation in the number of males and females were not by choice but mere co-incidence. Also, the selection of participants was done randomly according to the blood specimens that were brought for investigation for malaria parasites.

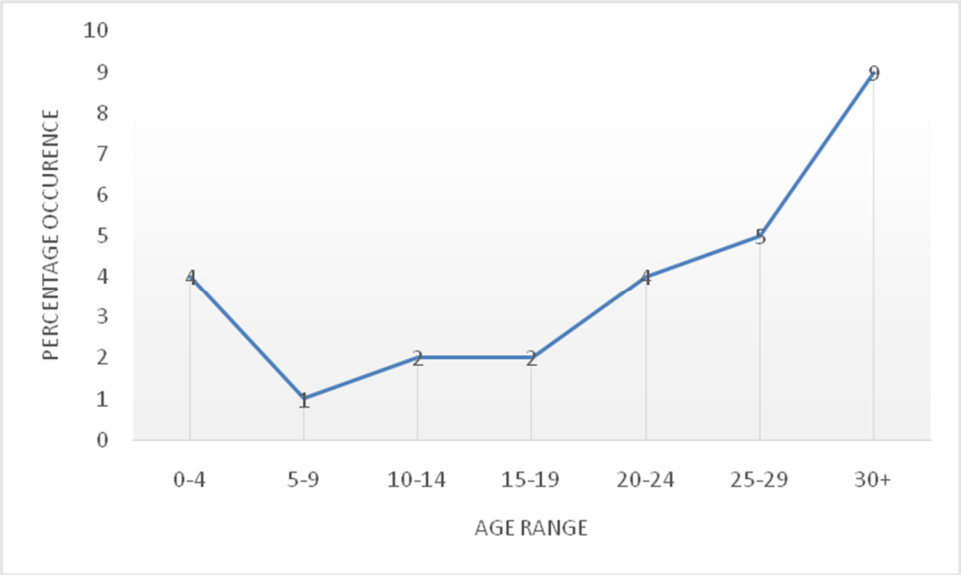


Figure 1: Age structure of the study groups.

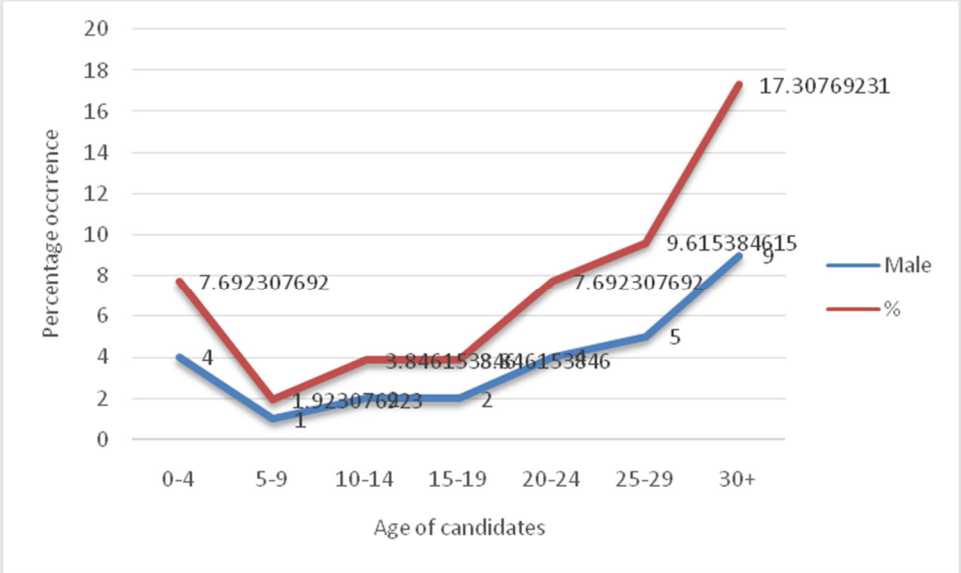
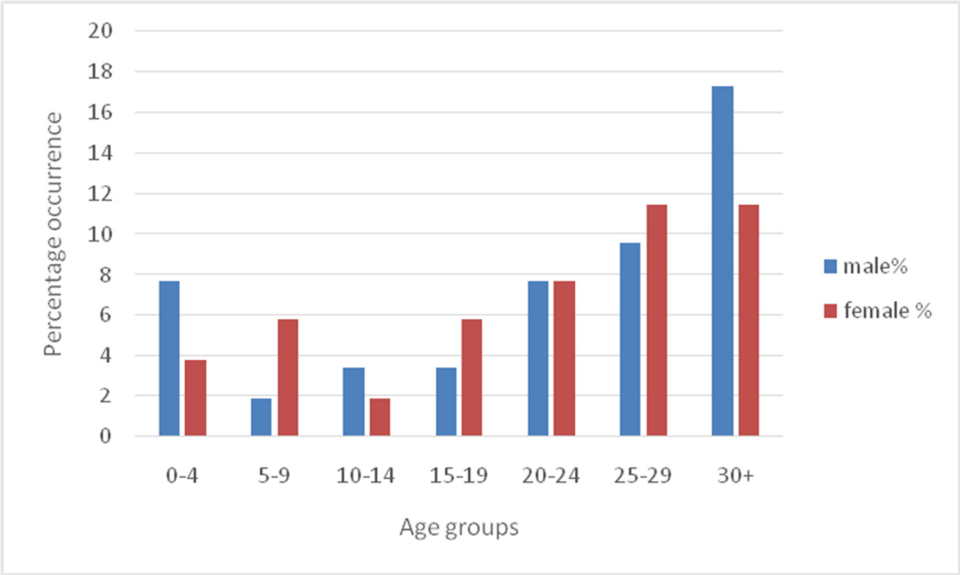


Figure 2: Sex structure of the population.

The high parasite counts per 100 WBC and densities per microliter obtained from this study is an indication of the severity of infection of malaria parasites in Okada community and environment. In addition, the fact that all the blood specimens examined were positive for malaria parasite shows probably that malaria infection is endemic in this community. Studies have shown that malaria is a serious infection in sub-saharan Africa accounting for 90% of malaria death (Nigerian Malaria Fact Sheet, 2011). Also, Nigeria has been listed among countries with high malaria intensity and prevalence (Bharti et al., 2007).

The high parasite counts and densities found in individual within the age range of 5-9 years was probably because of the following reasons: Firstly, the children within this age bracket are prone to malaria infection as they have the tendency of exposing their bodies to mosquito bites. They also expose themselves further to mosquitoes by playing outdoor with little or no notice of mosquito around them. Secondly, children of this age group, have not developed stronger immunity against malaria parasites and so they constitute one of the high risk of malaria infection. Information released in the malaria Fact Sheet (2011) also revealed that malaria account for 60% of out-



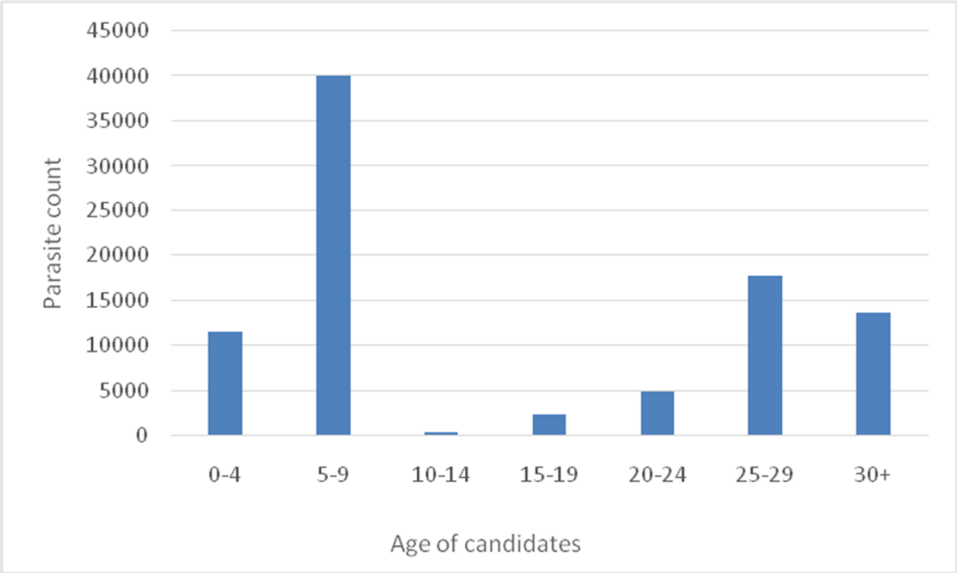


Figure 3: Average parasite counts according to age.

patient visits and 30% of hospitalizations among children under 5 years of age in Nigeria (Ashley and White, 2014).

Conversely, the lower parasite counts and densities in individual of age range of 15-19 years as compared with others could probably be because these individuals are semi adults and they are fairly aware of the consequences of malaria and mosquitoes. Also the individuals within this age group are either in secondary school or tertiary institution and the chances of mixing freely mosquito hiding site may be very low.

In general, the high occurrence of malaria parasite in females as compared with the male participants could be a function of the following reasons. Firstly, it may be a mere co-incidence whereby the more infected females came for investigation at a time when less infected males also came and may not necessary be the pattern of infection in this area. Most males especially the adults less educated ones resort to rural remedies to treat malaria infection, and so the few that attended hospital may not be intensely infected. Also females endured more in adult activity in this locality. The rural ones also involve in farming where they are constantly bitten by mosquitoes.

In addition, pregnant women have been known to constitute high malaria group due to their immunity status. Cot et al. (1993) and WHO (2016) have shown

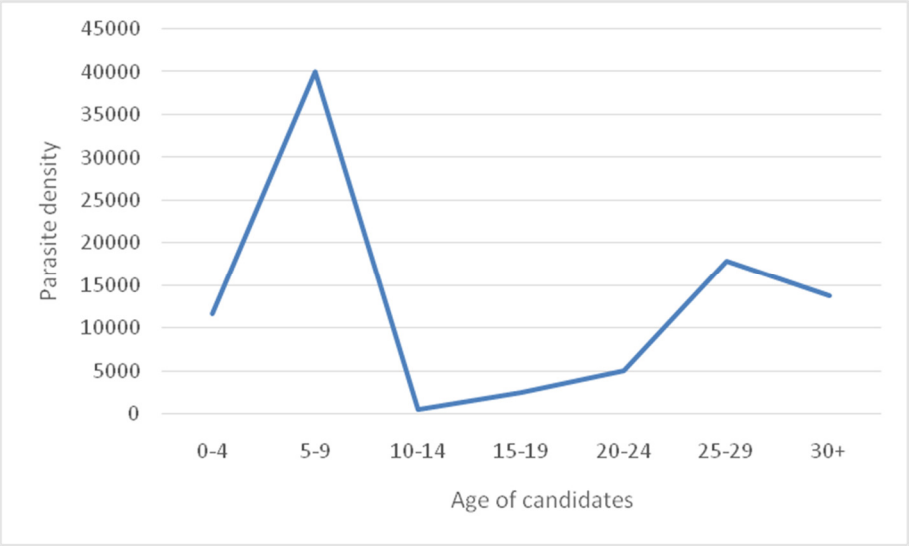


Figure 4: Average parasite density by age.

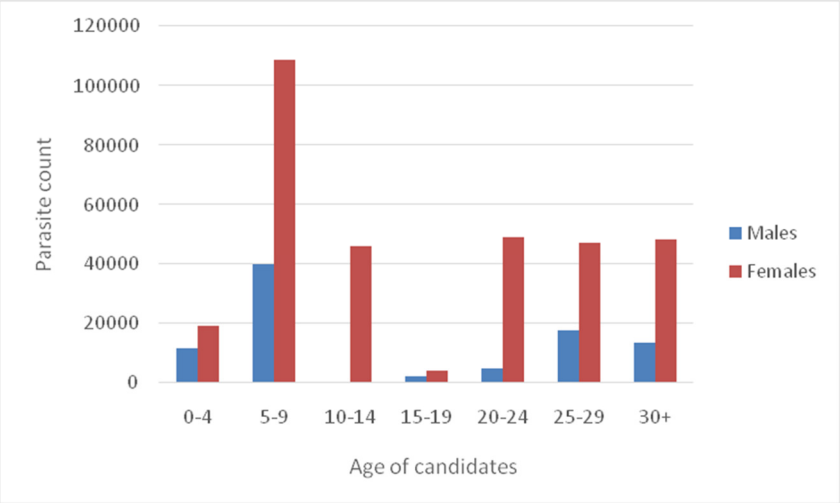


Figure 5: Parasite count according to sex.

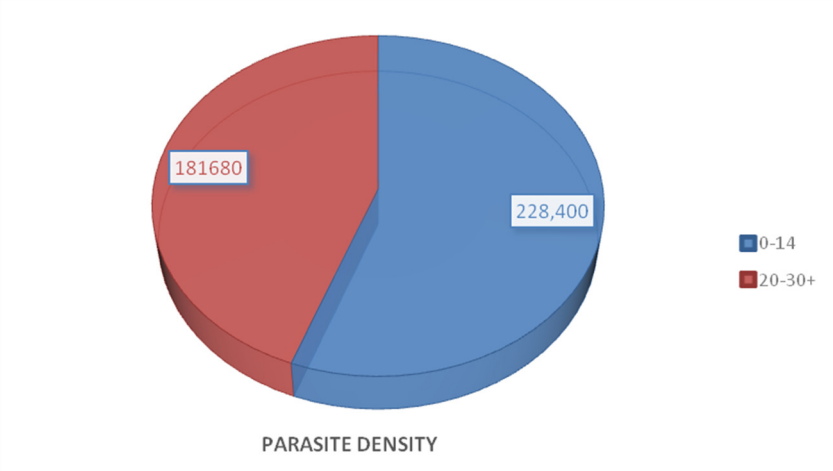


Figure 6: Comparison of parasite density in children and adults.

from studies that malaria increases during pregnancy. It also paves way for many other illnesses thereby worsening the condition of pregnancy (Ruqayyah et al., 2017).

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