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Full Length Research

Occurrence and Numeric Variations in Species and Sex Distribution of Anopheles Species in Malaria Endemic Communities of Akwa Ibom State

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Occurrence and numeric variations in species and sex distribution of *Anopheles* species found in human living rooms in three malaria endemic communities of Akwa Ibom State were studied. Test tube method and Insecticide spray methods were used to collect the adult specimens while different morphometric keys were used to identify these specimens. Generally, the results showed that the mean number of adult *Anopheles gambiae* and *Anopheles funestus* collected from the human living rooms in the rural communities of Ediene Village in Ikono, Obio Offot village in Uyo and Nung Oku in Onna L.G.As were statistically significant (P<0.05). Also, the percentage occurrence of the species varied markedly in terms of species composition. *A. gambiae* and *A. funestus* in Ediene village was 68.5% and 32.5%, 66.7% and 33.3% in Obio Offot and 68.8% and 31.2% in Nung Oku village. The result of this work as estimated from the occurrence values shows that 70% of malaria pandemic in this area is caused by *A. gambiae* while 30% is caused by *A. funestus* in these areas. These results have practical applications in zoology and functional health care delivery and in the anti-malaria fight.

Key words: Insecticide spray, Nung Oku, morphometric keys.

INTRODUCTION

In Nigeria, malaria is a leading cause of morbidity and mortality with a prevalence of 919 per 100,000 especially in the coastal states (RBM, 2003a, 2007). Malaria is a major public health problem in Nigeria, where it accounts for more cases and deaths than any other country in the world and is risk of about 97% of Nigerian's population (WHO, 1996; RBM, 2007). The remaining 3% of the population live in the malaria free highlands. There are an estimated 100 million malaria cases with over 300,000 deaths per year in Nigeria (RBM, 2007). Malaria in the country contributes to an estimated 11% of maternal mortality, it accounts for 60% of out patients' visit and 30% hospitalization among children under five (5) years of age (RBM, 2007).

Malaria has the greatest prevalence close to 50% in children of age 6 to 59 months in the south western, north central and north western regions. It has the least prevalence 27.6% in children of age 6 to 59 months in the south western, north central and north western regions (WHO, 1996; RBM, 2003a). Since the introduction of the Roll Back Malaria (RBM) control programme in the country, the populace has witnessed investment of large economic resources to combat this disease, such as distribution of 63 million long-lasting insecticide treated nets, further procurement under the debt-relief scheme of additional 9 million nets, alongside 103.3 million doses of artemisinin-based combination therapies to help treat children and pregnant women (RBM, 2003b, 2007).

Akwa Ibom State malaria situation is equally a source of concern as children, pregnant women and other adults are affected with high percentage rates despite aggressive effort by government and non governmental agencies geared at its control (RBM, 2007). Increasing population drift, deteriorating sanitation, climatic changes,

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urban development and settlement and negligence of basic control measures, have been the contributory factors to the seemingly unabated endemic malaria situation in the state.

Salako (1993) opines that the types of vector present in a place, population density and distribution as well as transmission competence are important factors controlling the risk of infection. So the vectorial system of malaria can be determined by the collective interaction between four major factors; the mosquito vector (female *Anopheles* mosquito), the malaria parasite (the *Plasmodium*), the susceptibility of host (vertebrate, human) and the environmental conditions; temperature, humidity, rainfall and breeding sites (Singh, 2003; Burfield and Reckie, 2005). The malaria vector, female *Anopheles* mosquito could be said to enjoy favourable conditions which enhances its vectorial competence, thus the increase in malaria problems and effort to check mate its continuous spread.

The problem of malaria endemism in these study locations could result from the state of occurrence and distribution pattern of the malaria vector found in this area. To this end, this study will therefore explore and document the frequency of occurrence and numeric variations in distribution of anopheles species in human living rooms in malaria endemic communities of Akwa Ibom State while suggesting recommendations that could assist in the sustainable control of mosquito vector in this area, in particular and other malaria endemic parts of Nigeria in general.

MATERIALS AND METHODS

The three communities selected for the study are in Akwa Ibom State, Nigeria. The communities are; Obio Ediene, Ikono Local Government Area (L.G.A.) in the Nothern region, Effiat Offot, Offot Community, Uyo L.G.A. in the central region of the State and Nung Oku Ekanem, Onna L.G.A in the Southern region.

Source of mosquitoes

The mosquitoes (adult) used for this research were obtained from all the study communities in Akwa Ibom State; Uyo, Onna and Ikono L. G. A.'s. The adults were collected from human volunteer's living homes using the test tube inversion method described by WHO (1992a). After collection suitable identification tools were used to identify and sort them into types and species.

Collection of adult

As prescribed by WHO (1992a) two methods were used to collect the adult specimens; Test tube method and Insecticide spray method.

Identification of mosquito

Student Morphometric identification keys described by Gillies and Meillon (1968), Service (1980), Ribeiro and Ramos (2003) were used to examine and identify the adult mosquitoes.

RESULT AND DISCUSSION

The mean number of adult *Anopheles gambiae* and *Anopheles funestus* collected from the human living rooms in the rural communities in Ikono, Uyo and Onna L.G.As were statistically significant ($P<0.05$) and is reported in Table 1 and Figure 1.

This research established the presence of *Anopheles* species (the malaria vector), in the breeding sites as well as the malaria parasite (*Plasmodium* species). Two types of the malaria vector were identified; *A. gambiae and A. funestus*. Similar reports uphold these two species of *Anopheles* as the most common and efficient malaria vectors in Nigeria (Despommier *et al.,* 2000; Salako, 1993). The conspicuous presence of malaria vector within a community and their density within human dwelling homes and settlements is a major determinant factor in malaria transmission (Trape *et al*., 1992; WHO, 1995; RBM, 2007). The spray sheet collection method utilized in this research has established the fact that the study communities (Ikono, Uyo, and Onna L.G.As) in Akwa Ibom State are quite endemic based on the number of adult *Anopheles* mosquitoes caught in human homes. Also, the fact that *A. gambiae* were more abundant than *A. funestus* confirms its incrimination as the most prevalent malaria vector in the area (Burfield and Reckie, 2005). The high frequency of occurrence of *A. gambiae* in these malaria endemic areas confirms that it is the most widely distributed and most adapted to human settlement. This attributes had been attested to by WHO (1995) reports. Worthy of note is the fact that *A. gambiae* is human blood specific and exhibits high ability to spread *Plasmodium* species while feeding from one host to tha other (WHO, 1995; RBM, 2003). This present research agrees with other findings that *A. gambiae* has high degree of ecological adaptability, breeding indiscriminately in a variety of aquatic environment, thus dominating malaria transmission than *A. funestus* (Ekanem, 1991; ICMR, 2002; NJMCA, 2003; Singh, 2003).

Conclusion

The result of these findings has established that the malaria endemism in the study area is as a result of the dense distribution (70%) of *A. gambiae* in this vast area. It also highlights the complementary role of *A. funestus* (30%) in the area. It posits that the dense distribution of *A. gambiae* is an indication of its wide ecological amplitude which is properly documented in literature. It also

Table 1. Numbers and species of adult *Anopheles* mosquitoes collected in human living rooms surveyed in the three communities.

Community and Location in the State.	Species of *Anopheles* collected	Living Room and the numbers of mosquitoes collected. 1	2	3	4	5	Total	(%)
Obio Ediene (Ikono L.G.A) Northern Region	*Anopheles gambiae*	20	28	30	32	17	127	(68.5)
	A. funestus	12	10	14	20	10	66	(32.5)
	Sub Total	32	38	44	52	27	193	(29.9)
Effiat Offot (Uyo L. G. A) Central Region	*Anopheles gambiae*	39	35	28	19	21	142	(66.7)
	A. funestus	16	18	14	13	10	71	(33.3)
	Sub Total	55	53	42	32	31	213	(32.9)
Nung Oku Onna L.G.A Southern Region	*Anopheles gambiae*	27	34	37	32	35	165	(68.8)
	A. funestus	8	10	22	20	15	75	(31.2)
	Sub Total	35	44	59	52	50	240	(37.2)
	Grand Total	122	135	145	136	108	**646**	**(100)**

Blocks = Community and location, Treatment = the living rooms surveyed, Effect of treatment=Number species of mosquito species collected.

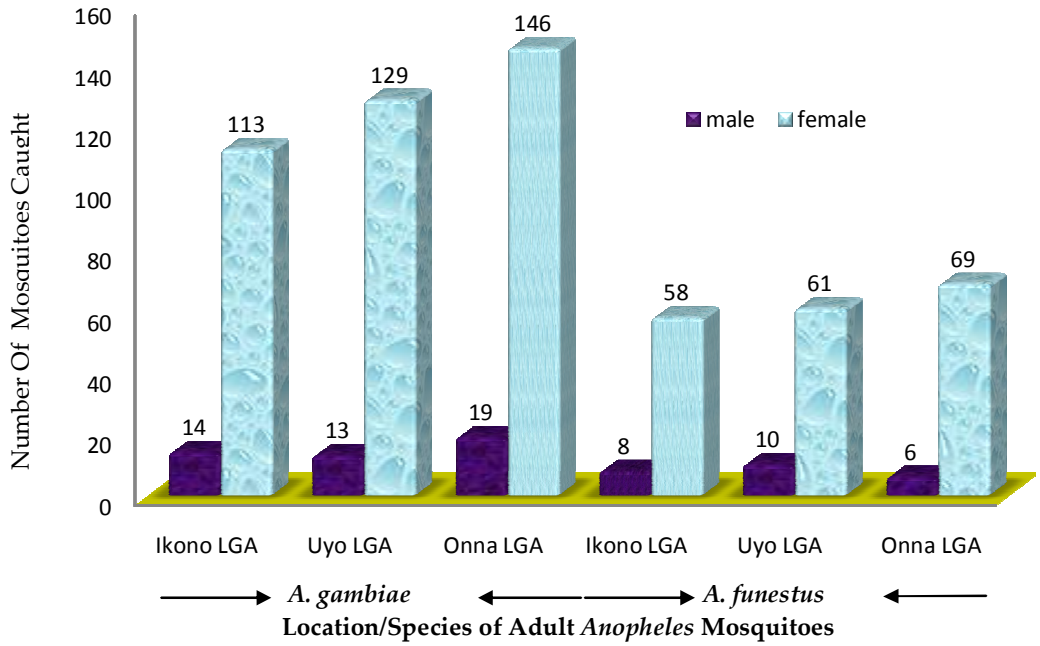

Figure 1. Sex distribution of adult *Anopheles* mosquitoes collected in human living rooms in the three communities surveyed.

recommends some measures which could assist in curbing the trend.

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